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Evaluation of the Problems Associated with
Application of Low Solvent Coatings to
Wood Furniture

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EVALUATION OF THE PROBLEMS ASSOCIATED WITH
APPLICATION OF LOW SOLVENT COATINGS TO WOOD FURNITURE

by

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16. ABSTRACT The report gives results of an evaluation of a low volatile organic compound (VOC) finishing system for the manufacture of wood furniture, and compares its performance in the manufacturing process to an equivalent conventional solvent-based system. (NOTE: The coatings manufacturing industry has advanced the state-of-the-art for producing low-VOC based finishes for wood furniture. The improved systems include waterborne, high solids, and catalyzed high solids coatings. These new coatings have the potential to overcome the earlier objections of the furniture industry to lower VOC emissions in this industry.) The production of furniture finished with a conventional solvent-based system and several days production of wood furniture finished with a low-VOC system were observed and evaluated. Both systems produced furniture under a contract with the General Services Administration (GSA), and were to be similar in color and style. The low-VOC system used a waterborne combined toner and washcoat, a catalyzed sealer, and a catalyzed top coat. All problems, process changes, personnel comments, and production figures were noted and analyzed. The reduction in VOC emissions was estimated from consumption data obtained during the observation period. The low-VOC finishing system successfully met the criteria established in the GSA contract.		
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Finishing	Operating Costs	Volatile Organic Compounds
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ABSTRACT

The coatings manufacturing industry has advanced the state-of-the-art for producing low volatile organic compound (VOC) based finishes for wood furniture. The improved systems include water-borne, high solids and catalyzed high solids coatings. These new coatings have the potential to overcome the earlier objections of the furniture industry to lower VOC emissions in this industry. The objective of this project was to evaluate a low-VOC finishing system for the manufacture of wood furniture and to compare its performance in the manufacturing process to an equivalent conventional solvent-based system.

CARLTECH Associates Inc., observed and evaluated the production of furniture finished with a conventional solvent based system and several days production of wood furniture finished with a low-VOC system. Both systems produced furniture under a contract with the General Services Administration (GSA), and were to be similar in color and style. The low-VOC system used a water-borne combined toner and washcoat, a catalyzed sealer and a catalyzed top coat. All problems, processing changes, personnel comments, and production figures, were noted and analyzed. The reduction in VOC emissions was estimated from consumption data obtained during the observation period. The low-VOC finishing system successfully met the criteria established in the GSA contract, reduction of emissions to less than 100 pounds VOC per 1000 square feet of furniture finished (45 kilograms per 93 square meters). The manufacturing economics, processes changes, impacts on the environment, potential effects on worker health, and changes in energy requirements are considered and discussed in detail for these low-VOC coatings.

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SECTION 1

INTRODUCTION

BACKGROUND

In 1979, the United States Environmental Protection Agency (EPA) issued Draft Control Technique Guidelines for volatile organic emissions resulting from the application of coatings in the manufacture of wood furniture. Industry, trade organizations and several individual companies raised numerous objections to the suggested use of new furniture coating technology based on the use of water-borne coatings in lieu of the conventional solvent-borne coatings.

Since 1979, the coatings manufacturing industry has advanced the state-of-the-art for the production of low volatile organic compound (low-VOC) coatings. As a result of this research effort, there have been improvements in low-VOC coatings, including high solids, catalyzed high solids and water-borne coatings. These improved coatings could help to overcome the earlier objections in the furniture industry to the use of low-VOC coatings.

The General Services Administration (GSA), in cooperation with EPA and the U.S. Army, awarded a contract to United Globe Corporation, a division of Turner Furniture Industries, for the manufacture of traditional style household furniture for the use by Army personnel stationed overseas. A special clause was included in this contract, requiring that 1000 buffets be finished with a low-polluting coating system, which was defined by GSA to be a coating system that contains less than 100 pounds of volatile organic compounds (VOC) per 1000 square feet of surface area finished (45.4 kilograms per 92.9 meters).

EPA had awarded a contract to CARLTECH Associates Inc. to evaluate the effects of using low-VOC coating systems in the manufacture of wood furniture. The GSA contract with United Globe Corporation provided the host site for those evaluations.

OBJECTIVES

The objective of this project was to determine the effects of using a low-VOC coatings system in lieu of a conventional solvent system in the manufacture of comparable or equivalent wood furniture. The major elements in the manufacturing process to be evaluated in this study included:

- o variances in equipment requirements to accomodate low-polluting coating systems,
- o variances in the number or sequence of processing steps,
- o manufacturing problems associated with the finishing systems,
- o variations in labor and energy requirements,
- o finishing system effects on process economics, and
- o reduction in pollution achieved by use of the low-VOC coating system compared with use of conventional coating systems.

This report does not present opinions about the aesthetic quality or commercial acceptability of the low-VOC finishes since the primary objective of this project was to determine the effect of low-VOC coatings on the manufacturing and finishing processes. The furniture produced during this program was required to meet minimum GSA standards for quality and color.

SECTION 2

CONCLUSIONS

Two furniture coating systems, a conventional and a low-VOC system, were evaluated during this study. Buffets finished with the low-VOC system were part of a suite of furniture and, therefore, were required to be generally equivalent in appearance and price to items finished with the conventional system. Except where specifically noted, the following conclusions are considered to apply only to GSA and similar types of government contract furniture.

SUMMARY CONCLUSIONS

The water-borne and catalyzed coatings system allowed a 40 percent reduction of VOC content from the conventional coatings system. The low-VOC system used approximately 76 pounds per 1000 ft² of surface area coated, compared to approximately 127 pounds per 1000 ft² for the conventional system. The contract goal of 100 pounds of VOC emitted per 1000 ft² covered was met.

- o Catalyzed coatings can be used successfully in the furniture manufacturing process. The problems noted during the trial run can be eliminated by providing additional worker training, improving ventilation, making minor adjustments to material, and by using properly adjusted spray equipment.
- o Catalyzed coatings did reduce VOC's by 35 percent of the total reduction, but their use alone would not have been sufficient to meet the goal specified in the GSA contract, less than 100 pounds of VOC emitted per 1000 ft² covered.

- o The water-borne coating was a major factor in achieving the contract reduction goal for VOC usage, contributing approximately 60 percent of the total reduction.

GENERAL CONCLUSIONS

Low-VOC coatings can be successfully used to produce furniture which is acceptable under the GSA specifications used in this furniture procurement. Due to the observed problem of grain raising, seeding and bridging, however additional processing will be required to provide continually acceptable furniture.

- o Although buffets finished with the low-VOC coatings were accepted by GSA standards for appearance, the surface was rougher in texture than the conventionally finished GSA furniture.
- o The low-VOC coating system used in this evaluation did not require increased number of personnel on the finishing room floor, changes in equipment, increases in oven temperature, or any other significant changes in the finishing process, to maintain production rates and quotas. However, supervisory personnel did jobs normally done by production line workers thus the net effect was an increase in worker load.
- o The cost of coating furniture with the low-VOC coating system used for this trial run was calculated to be equivalent to the cost of using the conventional coating system for GSA specification furniture. Material costs for the low-VOC system were less.

WATER-BORNE COATINGS

The water-borne toner/washcoat used in this trial, experienced grain-raising problems generally associated with the use of water-borne coatings in the furniture finishing process.

- o Additional sanding did reduce the surface roughness resulting from the use of the water-borne coating. The number of personnel assigned to the sanding operation was increased by one third, from four to six, to produce a satisfactory surface following the application of the water-borne coating.
- o There were no additional changes identified in the manufacturing process during this evaluation that would eliminate the problem of surface roughness.
- o The application of the filler (wiping stain) was affected by grain-raising and the failure of the water-borne toner/washcoat to effectively bind or limit penetration to the lower layers of the wood. Smoothness and consistency of color was difficult to maintain and extra effort was required on the part of floor personnel.
- o Use of the water-borne coating accounted for 59 percent of the total reduction in VOC used during this evaluation. The goal of 100 pounds of VOC per 1000 ft² of furniture coated would not have been achieved without the use of this coating.

CATALYZED COATINGS

- o The problems associated with use of the catalyzed sealer during this evaluation were mitigated or did not interfere with the manufacturing process.
- o These problems have been successfully mitigated at other furniture manufacturing facilities by providing additional training for the workers, adjusting the viscosity with a flow agent, improving inventory control, and increasing the exhaust air flow from the spray booths.
- o Use of the catalyzed sealer accounted for only 12 percent of the total reduction in the emissions of VOC's.
- o The two problems experienced with the catalyzed topcoat were minor and did not interfere with the manufacturing process.
- o These problems have been overcome at other furniture manufacturing facilities by using a different type of air assisted airless spray gun to eliminate the backspray, by increasing the exhaust air flow from the spray booth, and by adjusting the amount of catalyst used.
- o Use of the catalyzed topcoat accounted for 23 percent of the total reduction in the usage of VOC's. In addition to this coating having a lower VOC content, it required application of one layer versus two for the conventional lacquer, to cause this reduction.

SECTION 3

RECOMMENDATIONS

It is recommended that the buffets finished with the low-VOC system be tracked and re-examined every three years for up to ten years, for performance, durability and end-user acceptance. Information to aid in tracking this furniture is provided in Appendix A.

Future studies should be conducted on an entire cutting of furniture as opposed to a single item of furniture. This will aid the researcher in evaluating problems that could not have been predicted from experience with a single item. Use of a mix of furniture on the finishing line would be more representative of normal manufacturing conditions.

SECTION 4
MATERIALS AND METHODS

COATING MATERIALS

Guardzman Chemicals, Inc., supplied the coating materials used for both the low-VOC evaluation and the conventional finish for the GSA furniture. Several of the coatings (sap stain, wiping stain filler, and shade strain) were used in both systems. A toner, washcoat, sealer, and two coats of lacquer were also used in the conventional system. In the low-VOC system, a water-borne coating was used in place of the toner and washcoat, and the conventional sealer and lacquer were replaced with a catalyzed sealer, and a catalyzed topcoat. The coatings used in each system are listed in Table 1. Chemicals, physical and safety data for the coatings used during the evaluation are summarized in Appendix B. Appendix C provides the quality specifications for the coating used on the GSA procured furniture.

TABLE 1. COATING MATERIALS -- GSA CONTRACT

LOW-VOC GSA SYSTEM Name	CONVENTIONAL GSA SYSTEM Name
GSA Sap Stain*	GSA Sap Stain*
GSA Water-borne toner/washcoat	GSA Toner GSA Washcoat
GSA Wiping Stain* (filler)	GSA Wiping Stain* (filler)
GSA Shade*	GSA Shade*
Catalyzed sealer	GSA Sealer
Catalyzed topcoat	GSA Lacquer (2 coats)

*Same coating used in both evaluations.

The sap stain and wipe stain determine the basic overall color of the furniture. The shade stain is a minor component in both systems and is used to produce uniformity of color and to cover the raw edges of the back panels and back edges. The final color is determined primarily by the wipe stain. These stains are conventional solvent-borne coatings.

Both catalyzed and conventional sealers were used to fix the layers of color onto the wood. The topcoat layer(s), whether conventional nitrocellulose or catalyzed, further seal the color and provide a glossy finish. The catalyzed high-solids topcoat produced a three to four mil thick layer with a single application. Nitrocellulose lacquers produce a layer two mil thick or less per application, and two applications were necessary in the conventional GSA system to obtain the desired appearance and performance. The catalysts used in the catalyzed sealer and the catalyzed topcoat of the low-VOC system were para-toluenesulfonic acids.

In the low-VOC system, a water-borne coating was used in place of both the conventional toner and washcoat. Its function was to even out the undertone color and bind the lower layers so that additional color could build upon the wood. The washcoat in the conventional system is normally used to bind the underlying color layers.

FURNITURE

Conventionally Finished Furniture

The finishing of GSA contract furniture that was finished with conventional solvent-borne coatings was observed. A mixture of bedroom and dining room furniture, all to be finished with the same coating system, were run on the same day. The bedroom suite consisted of nightstands and nightstand back panels,

mirror frames, dressers, and bachelor chests. The pieces in the dining room suite included table rims and legs and the back panels for the serving cart. The quantities and item numbers of these pieces of furniture are listed in Table 2. Figures for each furniture piece is shown in Appendix G.

Low-VOC Evaluation - Buffets

The buffet was chosen by GSA to be the piece used in the low-VOC evaluations. One thousand were to be produced with the new finish, but were to match in color the rest of the dining room furniture. The buffet was coated with the drawers in place and the laminated top attached. The back panels were coated separately. Two shelves for the side compartments were coated on both sides. The buffet is shown in Appendix G. Photographs of buffets are shown in Appendix E.

METHODS

Calculation of Area Coated

The furniture manufacturer supplied the area of each piece listed in Table 2. Area calculations were confirmed using the GSA contract specifications. A copy of the GSA Procurement is in Appendix G. The surface area of the buffets was also measured at the plant by the evaluation team. There was insufficient data in the GSA specifications to confirm the areas provided for the table rims and legs, but the calculated areas for the other furniture items were in close agreement with those supplied by the furniture manufacturer.

The furniture manufacturer has a computerized inventory control system. Attached to each piece was a keypunch card that was removed as the piece was loaded onto the chain in the finishing room. These computer readable cards

TABLE 2. CALCULATION OF AREA COVERED

Amount	Description	Surface Area/Unit (ft ²)	Area/Unit (m ²)	Total Surface Area (ft ²)	Total Surface Area (m ²)
CONVENTIONAL GSA COATING EVALUATION					
81	Nightstands	8.19	0.76	663	61.6
261	Backs (Nightstands)	2.41	0.22	629	58.4
70	Mirrors	3.22	0.30	225	20.9
70	Table Rims	5.00	0.46	350	32.5
4	Dressers	17.70	1.64	71	6.6
218	Chests	16.40	1.52	3575	332.1
340	Backs (Serving Cars)	6.75	0.63	2295	213.2
46	Pallets (Table Legs)	17.00	1.58	782	72.7
Total area covered for Sap Stain				8590	798.0
-10	Chests (removed after sap stain)			-164	-15.2
Total area covered remainder of conventional run				8426	782.8
- 2	Dressers treated with low-VOC sealer and lacquer			- 35	- 3.3
Total area covered conventional sealer and lacquer				8391	779.5
LOW-VOC COATING EVALUATION					
1000	Buffets	30.24	2.81	30240	2809.4
1000	Back Panels (Buffet)	9.08	0.84	9030	838.9
2000	Shelves (Buffet)	3.07	0.29	6140	570.4
Total area covered for low-VOC evaluation (except for sealer and lacquer)				45410	4219.7
2	Dressers treated with low-VOC sealer and lacquer			35	3.3
Total area covered with low-VOC sealer and lacquer				45445	4222.0

were then tabulated for the count and type of furniture that entered the finishing room for each coating evaluation.

Total area coated was estimated by multiplying the number of pieces of each type by its unit surface area. These were then totaled for the units coated by each system. Ten chests to be coated with the conventional system were removed for woodwork repair after the sap stain was applied. These were subtracted from the total area when estimating usage of subsequent coatings. Two dressers from the conventional system evaluation were coated using the catalyzed sealer and topcoat. Their area was subtracted from the conventional sealer and lacquer coverage calculations and added to the low-VOC sealer and topcoat coverage calculations.

Each pallet of legs was estimated to contain the equivalent of 17 ft² of flat surface area. However, there was some disagreement among plant management personnel as to whether each pallet contained eight or nine legs. Since the evaluation team observed both situations, the total area of the legs was calculated on the basis of eight and one half per pallet. The use of this average value results in a maximum error of 51 ft², less than 1 percent of the total area covered in the conventional run. Area calculations are shown in Table 2.

Determination of Coating Usage

Actual consumption measurements were made for the two coating evaluations, one using the low-VOC system and one using the conventional GSA system. The first pallet of each of the two evaluation runs was tagged to denote the start of the evaluation. When that pallet entered a spray booth, a measurement of coating volume was made. Calibrated stick gauges were used to measure the volume in the coating container. The last pallet of the evaluation run was

also marked and volume measurements were taken again when that pallet entered a spray booth. The difference in these volume measurements was the amount of material used to cover the furniture in each evaluation.

Calculation of Pounds of VOC per 1000 Ft²

Using the area calculations and coating usage measurements described previously, the amount of material used to coat 1 ft² was determined by dividing the volume by the area coated and multiplying the result by 1000 to obtain the volume used per 1000 ft².

$$\text{VOL. COATING USED/AREA COATED} \times 1000 = \text{VOL. COATING USED/1000 FT}^2$$

The coatings manufacturer supplied density data for all coatings used. These were confirmed experimentally by the EPA Test Support Section of the Emission Standards and Engineering Division using EPA Test Method 24. Both sets of data are shown in Table 3.

The result of the previous calculation was multiplied by the density of the coating in pounds per gallon to obtain the weight used for 1000 ft².

$$\text{VOL. COATING USED/1000 FT}^2 \times \text{DENSITY} = \text{LBS. COATING USED/1000 FT}^2$$

The result of the above calculation was then multiplied by the weight percent of volatile organic compounds contained in the coating to obtain the weight of VOC emitted per 1000 ft² of furniture coated. The coatings manufacturer supplied the VOC content data which was confirmed experimentally by the EPA laboratory.

$$\text{LBS. COATING USED/1000 FT}^2 \times \% \text{ WEIGHT VOC} = \text{LBS. VOC EMITTED/1000 FT}^2$$

The results of these calculations were then converted to equivalent metric units utilizing the International System of Units.

TABLE 3. COATINGS' DENSITY AND VOC CONTENT

Coating	Coating Manufacturer's Lab			EPA Lab		
	Density		% VOC (wt.)	Density		% VOC (wt.)
	lb/gal	kg/l		lb/gal	kg/l	
LOW-VOC GSA COATING SYSTEM						
Water-borne Toner/washcoat	7.54	0.9035	43	7.88	0.9443	42.3
Catalyzed sealer with Catalyst (1)	7.75	0.9287	73	7.77	0.9308	71.0
				7.76	0.9298	73.9
Catalyzed lacquer with Catalyst (1)	7.65	0.9167	64	7.65	0.9164	64.5
				7.63	0.9148	68.0
CONVENTIONAL GSA COATINGS						
Sap Stain*	6.74	0.8076	97	6.73	0.8068	97.8
Toner	6.63	0.7945	99	6.63	0.7942	97.6
Washcoat	7.00	0.8388	92.1	6.96	0.9342	92.5
Wipe Stain*	7.44	0.8915	79	7.11	0.8526	83.4
Sealer	7.10	0.8508	81	7.22	0.8652	82.9
Shade*	6.65	0.7969	98	6.70	0.8034	99.0
Lacquer	7.55	0.9047	82	7.53	0.9025	78.9

* Same coating used in both systems.

(1) Based on laboratory analysis of freshly catalyzed material.

SECTION 5

EVALUATION PROCEDURES

SITE VISIT AND OBSERVATIONS

The evaluation involved on-site observations of the finishing of GSA furniture using conventional and low-VOC coatings. A reconnaissance visit to the plant was made three months prior to the low-VOC coating evaluation to determine if environmental sampling would be relevant to this project. This preliminary visit also provided the information necessary to develop a detailed work plan for the project.

On the day prior to the low-VOC evaluation, key personnel at the furniture plant were interviewed and a thorough inspection of the finishing process was made. The plant management team and key floor personnel were interviewed to obtain more detailed information about the plant and its operation. The coatings manufacturer's representative was also interviewed for background information on the specific coatings to be used in the evaluation. The layout of the finishing area and the finishing process were reviewed in depth.

At the beginning of the evaluation period, the investigators observed the startup of the day's production of conventional GSA furniture. Notes on the application of each coating were recorded by one member of the team on prepared worksheets. Examples of the worksheets are given in Appendix D. The other member of the team photographed the process and supplemented the photographic observations with notes.

Personnel assignments, skill level requirements, the equipment used, and the processing sequence in the finishing operation were noted and recorded. Line speed was set by the floor manager and was not changed without management approval.

The evaluation team was notified of any changes. The line speed was checked periodically to confirm the setting, and was verified by measuring the time required for one pallet to move between two support posts which were 10 feet apart. An attempt was made to note all unscheduled line stoppages. However, during startup of the low-VOC evaluation, stoppages were so frequent that only their frequency per hour was noted on a second worksheet (Appendix D).

These worksheets were also used to record information during start up of the low-VOC evaluation and during the production run on the following day. Supplemental notes on the low-VOC production run were also taken on the following Monday. Photographs of the low-VOC finishing operations are found in Appendix E.

LABORATORY PROCEDURES

Environmental Samples

Air samples were not collected for this project because of the plant configuration. Each spray booth was vented through its individual stack and several floor fans caused rapid mixing of the air outside the booths. Windows were open creating a cross-draft. Therefore, a composite representative sample to determine the amount of VOC released could not be obtained.

There were no water spray booths to remove VOC. Water pan booths were used for some operations to trap solids from the over-spray. Since it was not feasible to conduct air testing for VOC, testing of the water in the pan for VOC would not have provided any useful material balances information.

The assumption was made that all volatile material eventually was released to the atmosphere and could be calculated from density and VOC content data.

Coating Analysis

Coating analysis for VOC content was performed by the EPA Test Support Section of the Emission Standards and Engineering Division using EPA Test Method 24. The results of these analyses are shown in Table 3 in Section 4.

SECTION 6

RESULTS AND DISCUSSION

PROCESS DESCRIPTION

Although the company selected to produce the furniture was an established commercial furniture manufacturing firm, the company had only used low polluting coatings once on an experimental basis. Thus, this project provided a reasonable test of the adaptability of a company to new manufacturing materials and processing requirements. The company was therefore required to initiate a production run using low polluting coatings, identify any manufacturing problems and take corrective action for identified problems.

Finishing Room

The finishing room, where these evaluations took place, spans several levels. Furniture is moved through the finishing process on pallets hung from a conveyor chain. The path and length of the chain is fixed and cannot be changed. If additional drying time is required between any two steps, the only options available are to slow down the chain, or to move the next finishing step to a spray booth further down the chain. In some cases, it is not possible to move an operation because of limitations in the type of spray booth and spraying equipment available at alternate locations. The plant manager put it succinctly: "We are married to this chain."

There is a large oven at one end of the finishing room, through which the chain carries the furniture. Again, the residence time in the oven is set by the chain configuration and speed. The oven has two levels which are traversed by the chain. The higher level is approximately 10°F hotter than the lower

level which is kept at approximately 110°F (Table 4). The large openings necessary for the furniture to pass into and out of the oven, also allow heat to escape into the finishing room.

During the three days of evaluations, outside air temperature rose to the high 80's and low 90's, and the humidity was moderate to high (Table 4). There was no climate control inside the finishing room. Many large fans, which were primarily trained on the workers, did provide some general air circulation.

The chain speed was set by the finishing room supervisor. Any spray gun operator could temporarily halt the chain, if some problem arose or if he/she got behind. At full speed, the chain moved at approximately 18 feet per minute. During the test runs the chain was set at full speed except for the first few hours after start-up of the low-VOC system, when the line speed was then set at 12 feet per minute (Table 5).

Assembly and Packing Room

The assembly and packing room was on the floor below the finishing room. Following a brief cool-down period, the furniture was assembled. Backs were attached, laminated tops re-washed, and drawer pulls and other decorative hardware were installed. The inside of the drawer slides were waxed. Mirrors were placed in the frame and rims attached to table tops. In the case of the buffet, the silverware drawer was lined with felt and dividers installed. The back of the furniture was stamped and stencilled with stock and other appropriate identification numbers. The plant inspector checked each item one last time before the furniture was wrapped in a plastic foam sheet and crated. The crated furniture was immediately loaded onto trucks and moved to the warehouse.

TABLE 4. OVEN AND OUTSIDE TEMPERATURES AND RELATIVE HUMIDITY

Date	Coating System	Lower Oven Temperature*	Outside Peak Temperature*	Outside % Relative Humidity
7/18/85	Conventional GSA and Low-VOC water-borne	110 (43.3)	83 (28.3)	46
7/19/85	Low-VOC	109 (42.8)	89 (31.7)	45
7/22/85	Low-VOC	109 (42.8)	93 (33.9)	41

*Degree Fahrenheit (Degrees Celsius in parentheses)

TABLE 5. OBSERVED LINE SPEEDS AND STOPPAGES

Date	Time Period	Frequency of Stoppages	Line Speed (feet/minute)
7/18/85	7:30 AM - 2:00 PM Conventional GSA	Scheduled only *	18/19
7/19/85	2:00 PM - 4:00 PM Begin Low-VOC Run	Very frequent	12.5
7/19/85	7:30 AM - 4:00 PM	Average 4 times/hour	18/19
7/22/85	7:30 AM - 1:00 PM	Average 1 time/hour	18/19
7/22/85	1:00 PM - 1:30 PM	Complete stop - power loss	
7/22/85	1:30 PM - 4:00 PM	Average 1 time/hour	18/19

*Scheduled stops include two 10-minute breaks at 9:20 AM and 2:20 PM, and a one-half hour break for lunch at noon.

One significant difference between the production of GSA furniture, as contrasted with commercial products, was the attachment of the back panels. GSA required the backs to be attached with screws, while commercial furniture backs are attached with staples. The labor for this operation was estimated to be doubled from the conventional method because holes had to be pre-drilled prior to inserting and tightening the screws. The additional step allowed more time for air-drying and curing of the finish before the furniture was crated.

Pump Room

Most of the finishing materials are stored and dispensed from a separate building, usually referred to as the pump room. This concrete block building is located across a private dirt road on company property. All finishing materials except for lacquers, which are stored outside in bulk storage tanks, are stored here in 55 gallon drums or 5 gallon cans. Most of the finishing materials, including the lacquers which are transferred to 150 gallon tanks inside, are pumped through stainless steel lines directly to the work stations in the finishing room. Occasionally, special finishes are pumped from local pressure pots in the finishing room. The sap stain, which was used on both conventional and low-VOC GSA furniture, and the low-VOC water-borne coating, were dispensed from individual local pressure pots in the finishing room during these evaluations.

Inspection and Repair

There were two inspectors on the finishing floor and one inspector in the packing room. Normally, 10 percent of the furniture requires minor repair, generally due to flaws in the wood, not for finishing problems. The quantity

of rework due to coating defects is so low that no specific records are kept. The manager estimated for this plant, that less than 1 percent of the items processed require complete stripping and re-finishing. During this evaluation, no pieces of furniture, neither conventional nor low-VOC, had to be stripped and refinished due to coatings problems or flaws in the finish.

Conventional GSA Furniture Finishing

The GSA furniture manufacturing process followed standard operating procedure for conventional coatings systems. The low-VOC coating followed essentially the same procedure with minor variations. Other coatings systems vary in the number and type of coating layers, depending on the style and desired effect. Figure 1 is a flowchart showing the conventional GSA and the low-VOC GSA finishing processes in parallel.

Partially assembled furniture was loaded uncoated onto hanging pallets which entered the finishing room on the moving conveyor chain from the floor above. Back panels, shelves, mirror frames, table legs, and table rims were loaded separately. The cases, e.g., dressers, chests and nightstands, had the drawers in place and the laminated plastic tops attached. An air spray was used to remove excess dust from the furniture pieces before they entered the first spray booth.

The first layer of stain was applied to the raw wood in a baffle type spray booth. GSA Sap Stain was dispensed from a pressure pot with a recirculating pump located in the finishing room. For other types of furniture, the stain could be dispensed from the pump house. This stain was used in both the conventional and the low-VOC finishing systems. It was applied with air spray guns operated at a pressure of 65 psi.

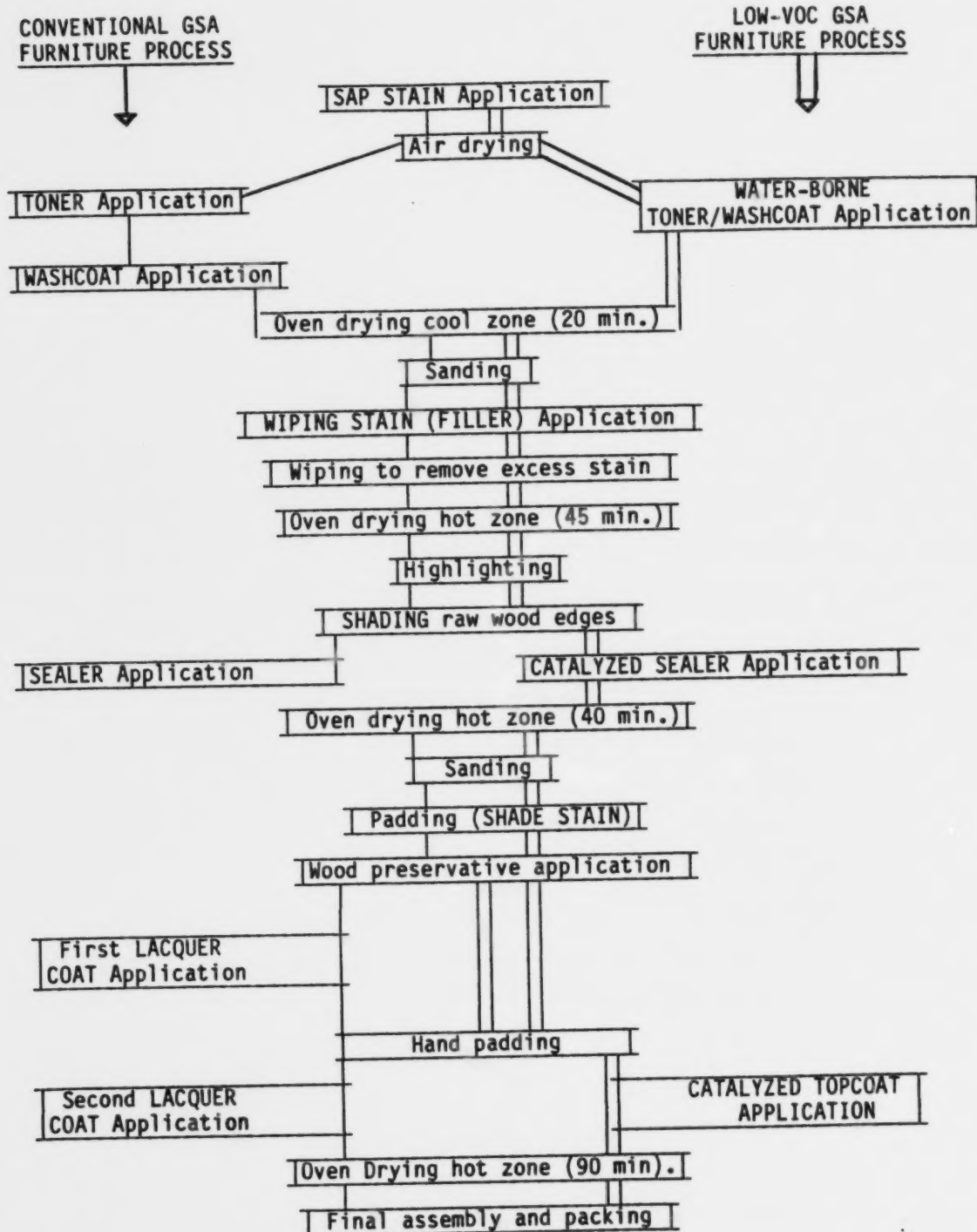


Figure 1. Flow chart of furniture finishing process for both systems.

Three employees used air spray guns to apply the sap stain. After the initial spraying, one employee applied stain to the drawer edges by hand wiping.

After passing out of the spray booth, the chain ascended to the upper level and the furniture was air-dried for approximately 10 minutes. Although there was no need to provide drying time for this particular stain, the fixed configuration of the conveyor chain allowed no other options.

The toner is then applied in a water pan type spray booth. The toner for the conventional finish was dispensed from the pump house from an agitated 55 gallon drum. It was applied by one worker using an air spray gun operated at a pressure of 55-60 psi. The furniture was briefly air dried as it moved on to two adjacent spray booths, for application of the washcoat.

The washcoat was applied in a baffle type booth by two workers using air spray guns operated at a pressure of 60 psi. It was also supplied from the pump house. The washcoat is used to bind the previous layers and provides a base for the wiping stain.

The furniture proceeded into the oven for approximately 20 minutes on the cooler lower level. After leaving the oven, the furniture was sanded using 220 zinc stearate sandpaper or plastic scouring material. There were five sanders and one inspector assigned to this operation. The inspector also applied touch-up sanding on any areas missed by the sanding crew.

The next step, application of the wipestain filler, used an airless spray gun to apply a coat of wiping stain at a water pan spray booth. The stain was applied in excess and was visibly dripping from the pieces. Ten workers removed enough excess stain to achieve the right color. This step had to be accomplished quickly before the stain began to set. Retarders, consisting of high-boiling

petroleum solvents such as naptha, were added to slow down the drying process. During the observation of conventional GSA furniture production, 3 gallons of retarder had been added to the drum of wiping stain and is included in the total volume of filler used in the conventional system.

Touch-up was occasionally required and this was done with a rag dipped in naptha. From this point on the basic color of the furniture was set, although touch-up padding was applied before the final lacquer coat.

The furniture was then moved into the oven for approximately 45 minutes of drying time. During this period the furniture passed through the upper level of the oven which is approximately 10°F warmer than the lower level. As the furniture moved out of the oven, two employees spot sanded the fronts and outer sides of the cases with 180 garnet paper to add highlights. After leaving the oven, the furniture is allowed to cool for about 5 minutes before the next operation.

The next step was a minor shading operation, where furniture backs are sprayed to cover the raw wood. For example, backs of the rear panels of the cases, and edges of the open rear of the cases, were lightly touched with the spray so that raw wood would not show. This shading was applied by one worker at a baffle type spray booth. The laminated tops were covered with a cardboard shield in preparation for the next step, application of the sealer.

The sealer was applied in a water pan spray booth using an airless gun operated at a pressure of 70 psi. This material was supplied from a tank in the pump house which was not equipped with an agitator. Two spray gun operators applied this coating. The furniture dried in the hot zone of the oven for 35-40 minutes.

At the exit of the oven, four workers sanded the furniture with 220 stearate paper or plastic scouring material. Any white spots or streaks were corrected in the next booth by shading with GSA Shade Stain applied with an air spray gun operated at an air pressure of 25 psi. This shade was also used for hand padding following application of the first coat of lacquer. Padding was a minor operation and not much material was used. Some hand-padding to touch up the molding and the drawer edges was also accomplished at this work station. Four people performed this hand-padding operation.

The furniture continued to the next booth where a wood preservative was applied to the raw wood inside the drawers and the drawer cavities to prevent adsorption of water and swelling. Although not part of the normal finishing process at this plant, this step was specified by GSA because the furniture was to be shipped overseas and would be exposed to radical changes in climatic conditions. This step was not included in any calculations of cost or VOC because it was not considered to be a part of the finishing operation.

Next the furniture entered the first lacquer booth and the laminated top was again covered with a cardboard shield. Lacquer was applied by two workers with air assisted airless guns operated with 20 psi air and 600 psi fluid pressure. About 5 minutes of air drying time was allowed before the furniture entered the second lacquer booth. One person was assigned to apply additional padding before the second lacquer coat. Two workers applied the second coat of lacquer with the same type of atomizer gun. One person wiped down the laminated plastic top following application of the second lacquer coat. The furniture then entered the oven for one and one-half hours of drying time. A portion of that time was spent

in the hot zone of the oven. As it exited from the oven, two workers smoothed the inside of the drawers with electric sanders.

The furniture then descended to the floor below for a minimum one-half hour cool-down before final assembly. The procedure for final assembly was previously described under Assembly and Packing Room.

Low-VOC GSA Buffet Finishing

This description of the low-VOC buffet finishing will only include differences between the conventional finishing process described above and the process for finishing buffets with the low-VOC system. All equipment and personnel assignments were the same, except as noted below.

The evaluation run using low-VOC coatings to finish 1000 buffets began at 2:00 PM at a slower line speed of 12.5 feet per minute. This was done for two reasons. First, the management did not want the buffets to reach the sealer booth before the end of the day. Since the low-VOC sealer had a limited pot life following addition of the catalyst, it was preferable to start application of the sealer in the morning. Second, the slower rate allowed time for worker training and process adjustment. This was the only instance of the line speed operating at a reduction during the entire evaluation period. There were frequent stoppages when the low-VOC coatings were introduced, which is not unusual with a new system and was partially because of workers getting behind due to the large surface area of the buffets.

The buffets entered the sap stain spray booth, were coated using air spray guns and air-dried. The buffets then moved to the toner spray booth for the application of the combined water-borne sealer and toner. The coatings manufacturer representative instructed the spray gun operator in the best technique

for applying the coating. A longer hose was used to give the sprayer more time to coat the buffet which had a surface area of over 30 ft². As a precaution, the water-borne toner was pumped to the air spray gun from a pressure pot located in the finishing room rather than from the overhead lines from the pumphouse. Although the pumphouse lines are stainless steel, some of the fittings used in the delivery system could be subject to corrosion from the water-borne coating.

The buffets were air-dried for about 10 minutes before proceeding into the oven for 20 minutes. Problems were encountered in the subsequent sanding operation. Additional sanding was required for each piece in an attempt to achieve smoothness because the water in the water-borne toner/washcoat had caused the wood grain to raise. Two sprayers from the idle washcoat booth were transferred to the sanding operation. In addition to these seven workers, the inspector sanded on a full-time basis.

Problems were also encountered in the application of the filler, GSA Wipe Stain. The preceding step, using the water-borne toner/washcoat, did not sufficiently bind the previous layer so that color could "build" and the filler stain penetrated too deeply into the wood. Therefore, the wipers could not remove sufficient stain to achieve the desired color. Two changes were made. First, more retarder was added to the wipe stain to produce a 1:1 mixture of retarder to stain. Second, one worker and an inspector were re-assigned to wipe down the pieces with naptha to wash away the excess color.

The first group of buffets entered the oven and 15 minutes later, the work day was over and the line was shut down. This initial group stayed in the oven overnight. No difference was noted between the buffets that dried overnight in

the oven, the few that were air-dried overnight, or subsequent buffets that dried for the usual 45 minutes in the oven.

When the line was re-started the following day, the buffets proceeded to the next spray booth for application of the catalyzed sealer. As a precaution, one worker was reassigned to the sealer booth to wipe down the laminated top, since the catalyzed sealer could not be removed after drying. The sealer created an "orange peel" surface effect before drying. "Orange peel" is a term applied to a surface that has minute pits, appearing like the surface of the skin of an orange. Two dressers coated with conventional finishes to this point were coated with the low-VOC sealer. They too had an "orange peel" surface. The "orange peel" added to the surface roughness of the finished product.

Special procedures were necessary at the end of the workday to prepare the catalyzed sealer for overnight storage because the catalyst had a pot life of only one day. The instructions from the coating manufacturer's representative were to dilute the catalyzed material by adding an amount of uncatalyzed sealer equal in volume to the catalyzed sealer remaining in the drum. The next day, an appropriate amount of catalyst was to be added for the additional amount of material. This dilution was performed on Friday at closing and the additional catalyst was added on Monday. When the sealer was applied that Monday, it was too thick and created a "seeded" surface. The dried coat felt like sandpaper. In the industry the term "seeded" is applied to a surface full of small hard bumps that feel like seeds. Production was temporarily halted and the material was replaced with a freshly-catalyzed drum of sealer.

After application of the sealer, the "seeded" buffets proceeded to the oven for 35 to 40 minutes of drying time. Additional sanding was needed on the pieces

with the "seeded" surface. The sanders complained that sanding these pieces was difficult and additional physical effort was required. Technical representatives from the coatings manufacturer concluded that the procedure for holding the sealer overnight was not adequate for an extended period such as a weekend. The coatings manufacturer's representative also believed that the hot weather over the weekend and the uncooled pumphouse contributed to the problem and promoted the catalysis of the sealer, causing it to "set-up" and "seed." The freshly catalyzed material did not have this problem.

The spray operators complained about the smell of the sealer. They did not feel that fumes were being adequately handled by the spray booth. Other finishing room workers began to complain immediately after the catalyzed coatings were introduced to the process. The most common complaint was the strong odor from the material and its tendency to make the eyes burn. The finishing floor manager noted similar complaints throughout the evaluation period.

There was approximately one-third more sludge from the solids in the water pans at the end of the day. This sludge is normally bagged after working hours, mixed with wood shavings and burned in the incinerator. The evaluation team observed the water pan clean-out and discussed this procedure with plant maintenance personnel.

The buffets proceeded from sanding through the wood preservative application and padding. In addition to both spray and hand padding, a brown crayon was used to cover the edges of the molding.

The catalyzed lacquer was applied in the second of two lacquer booths. No additional personnel were assigned to this step. After application of the lacquer, the furniture was returned to the hot zone of the oven for one and one-half hours. However, it was still tacky or wet in places when it exited the

oven. This was particularly apparent along the moldings. The condition, termed "bridging" by plant personnel, could indicate that the catalyzed topcoat could require additional time to cure compared to the conventional nitrocellulose lacquer or additional catalyst.

There was some concern by the plant management that "printing" would occur when the furniture was packed due to the incomplete cure. "Printing" refers to the imprinting of the surface texture of the packing materials on the uncured finish of the furniture. However, the evaluation team found no evidence of printing at the time of packing and shipping from the plant.

Only one coat of catalyzed topcoat was used in place on the two coats of lacquer used for conventional finish. The catalyzed lacquer can be applied in a thicker layer which is sufficient for protection of the furniture. Additional coats of the catalyzed lacquer could not be applied in this plant because the first coat must cure at least 45 minutes before the second coat is applied. There is only about 10 minutes drying time available between the two lacquer booths in this plant.

Concern was indicated by plant management about possible requirements for stripping and recoating (rework) of furniture finished with the catalyzed lacquer. Since the finish represents only about 10 percent of the total production cost, reworking is a cost-effective operation. Conventional nitrocellulose lacquers can be removed relatively easily in a thinner bath. Because of its greater chemical resistance, the catalyzed lacquer must be removed by brushing on acid and scraping. The plant management was concerned that this procedure could also dissolve glue and gouge the surface, adding significant costs to the reworking operation. Because none of the low-VOC finished pieces required reworking, the evaluation team could not assess if this was a problem. The lack

of reworking for the low-VOC coatings was not a significant finding because the rework rate is very low for this facility, less than 1 percent.

Lacquer sprayers complained that the backspray was sticky and clung to their faces "like chewing gum." Their shoes stuck to the cardboard floor covering, which hampered the movements of the operators and the covering had to be replaced after one day. The cardboard floor covering normally is replaced weekly, after plant shut-down on Friday. The water pan in the lacquer spray booth, similar to the one in the sealer booth, contained approximately one-third more sludge at the end of the day.

The final product of the low-VOC process was similar in appearance to the conventional GSA furniture. The surface was somewhat rougher to the touch. No buffets were rejected because of the finish, which is consistent with this facility's rework rate. The GSA inspector visited the plant as the final buffets were being finished. Although his inspection indicated that the surfaces were rougher, he did approve the quality of the furniture.

ANALYSIS

Environmental Effects

Releases to the Atmosphere. The use of the low-VOC system under study did significantly reduce the amount of volatile organic compounds released to the atmosphere. Calculations were based on coating VOC content and density analysis as determined by the EPA laboratory and actual usage per 1000 ft² measured during the operational evaluation. The reduction in VOC was 40 percent. Of the 50.8 pound reduction, 59 percent of the reduction in VOC emitted was due to using the water-borne coating in place of the washcoat and toner, 12 percent

was due to using the catalyzed sealer, and 23 percent was due to using the catalyzed topcoat.

The goal of 100 pounds of VOC emitted per 1000 ft² coated was easily met with this system. Based on EPA laboratory data, the total VOC emitted was only 75.7 pounds per 1000 ft², a reduction of 50.8 pounds. The use of the water-borne coating accounted for 29.9 pounds of this reduction, the catalyzed sealer for 6.1 pounds, and the catalyzed topcoat for 11.6 pounds. These results are shown in Table 6.

The following example will put the observed reduction into perspective. If the 45,445 ft² (4221.8 m²) of surface area that was coated with the low polluting systems had been coated with conventional systems, then 5748.8 lbs of VOC would have been emitted to the atmosphere. However, due to the lower VOC content of the coating system, only 3442 lbs of VOC was emitted which equals a 2309 lb or a 40 percent reduction in VOC emission to the atmosphere.

The dollar savings are similarly dramatic for that same 45,445 ft² of surface area coated for 1000 buffets. Based on the reduced coating requirements, there was a \$1280 reduction in coating costs.

Solid Waste. There was an increase in the amount of solid waste generated as sludge, trapped in the water pan booths after the spraying of the high solids catalyzed coatings. Plant personnel estimated this increase to be approximately 33 percent over normal conventional coatings. This is not a major environmental problem for this plant, because these sludges are metal-free, and can be burned in the state-approved incinerator.

Analysis of Problems

Water-borne Toner/Washcoat. The major problem with the water-borne coating

TABLE 6. VOC EMITTED PER 1000 SQUARE FEET
LOW-VOC COATING SYSTEM

Coating	Total Coating Used (1) gal	Coating gal/ 1000 ft ²	VOC lb/ 1000 ft ²
GSA Sap Stain*	73	1.61	10.6
GSA Water-borne Toner/Washcoat	68	1.50	5.0
GSA Wipe Stain*	208	4.58	27.2
GSA Shade Stain*	5	0.11	0.7
Catalyzed Sealer with Catalyst (2)	128(3)	2.82	16.2
Catalyzed Topcoat with Catalyst (2)	140	3.08	16.0
TOTAL VOC EMITTED PER 1000 FT ²			75.7

* Same coating used in both systems.

(1) 45,410 ft² total area coated.

(2) Based on laboratory analysis of freshly catalyzed material.

(3) 45,445 ft² total area coated

TABLE 7. VOC EMITTED PER 1000 SQUARE FEET
CONVENTIONAL COATING SYSTEM

Coating	Total Coating Used gal	Coating gal/ 1000 ft ²	VOC lb/ 1000 ft ²
GSA Sap Stain*	17.5(1)	2.04	13.4
GSA Toner	22.5(2)	2.67	17.3
Washcoat	23.0(2)	2.73	17.6
GSA Wipe Stain*	38.04(2)	4.51	26.7
GSA Shade Stain*	2.0(2)	0.24	1.6
GSA Sealer	31.2(3)	3.72	22.3
GSA Lacquer (4)	39.0(3)	4.65	27.6
TOTAL VOC EMITTED PER 1000 FT ²			126.5

* Same coating used in both systems.

(1) 8,590 ft² coated total area coated.

(2) 8,426 ft² excludes 10 chests removed after sap stain.

(3) 8,391 ft² excludes 2 dressers treated with catalyzed materials.

(4) Includes applications of two coats of conventional lacquer.

was "grain raising" caused by the water in the formulation. Grain raising caused the surface to be rough and necessitated extra sanding. The water-borne coating also opened the grain and allowed the wipe stain (filler) to penetrate too deeply. Increased penetration caused the color to be darker than desired and the furniture had to be wiped with naphtha to remove the excess stain.

The coating manufacturer could not identify any clients who had extensive experience with this coating to determine if these problems could be solved with experience.

Catalyzed Sealer. Three problems with this coating were identified. The first is that the catalyzed material had a relatively short pot life (nominally one day). An attempt to extend the pot life over the weekend shutdown failed. The coating began to cure in the drum and produced a very rough "seeded" coat when spray operations were resumed on Monday. This problem was the result of the inexperience of both the furniture manufacturer and the assigned coatings manufacturer's representative. Two other clients use this type of sealer extensively, a laboratory furniture company, and a household furniture manufacturer. Discussions with these companies indicate that they had no problem with the sealer setting up because they do not catalyze large amounts of material at one time.

The second problem involved the production of an "orange peel" effect on the surface of the furniture. Other manufacturers report they have this problem occasionally when the sealer was not adjusted to the proper viscosity with a flow agent, or when an inexperienced operator stood too close and sprayed the material on too thick. These manufacturers eliminated the problem by adjusting the viscosity of the material and providing additional operating training. The

orange peel remained a minor problem throughout this short evaluation and contributed to the rough texture of the buffet service.

The last concern with the catalyzed sealer involved complaints from the workers about odor or irritation. In the other two plants using this material, there were no similar complaints. In both of these plants this material is sprayed in baffle-type booths with a very strong air exhaust system with high stacks and large exhaust ducts.

Catalyzed Topcoat. There were two problems with the catalyzed topcoat. The topcoat was wet or tacky along the molding edge after drying in the oven. This effect is termed "bridging." Other companies that were contacted indicate no problems with "bridging" as long as the oven temperature was maintained at 110°F and a sufficient amount of catalyst was used in the formulation. It was also indicated that the drying time should be a minimum of 40 minutes. The furniture manufacturer did maintain the oven very close to 110°F during this evaluation and the drying time was one and one-half hours. However, they did not adjust the amount of catalyst during the test run.

Workers complained about the fog that settled over the floor and equipment in the work area that made working conditions sticky. Other companies contacted during the course of the project that had experience with low-polluting coatings indicated that in addition to the strong pull from the exhaust fans in the baffle booths, the air assisted airless spray system they used produced less fog. Their sprayers are set for 50 psi fluid pressure and 12-15 psi air pressure. These adjustments seemed to minimize their fog and eliminate sticky

conditions at the spray booth. During this evaluation, the furniture manufacturer used an air assisted airless gun with 20 psi air pressure and 600 psi fluid pressure.

Although there were no problems with "printing" during this evaluation, the plant management was concerned about the potential for this to occur, especially since "bridging" occurred. The other manufacturers indicated that they had no problems with "printing" with this coating.

Economic Analysis

Coating Cost. The low-VOC coating system, including both the water-borne and catalyzed coating, was determined to be less expensive than the conventional solvent based system. The cost of the low-VOC coating system per 1000 ft² coated was estimated to be approximately \$101.03, or \$4.59 per buffet. This is compared to a cost of \$129.26 per 1000 ft² or \$5.98 per buffet for the conventional system. During the evaluation process, the corresponding low-polluting coating per 1000 ft² was significantly lower in cost than the conventional coating. For instance, the low-polluting sap stain due to the lower volume required was 21 percent cheaper than the corresponding GSA sap stain. The toner was 63 percent cheaper than the corresponding GSA coating and washcoat combined. There was no requirement for a washcoat, thus totally eliminating that material cost from the low-polluting system. The shade stain and topcoat were cheaper than the corresponding GSA coats by 54 and 18 percent, respectively. The wipestain due to the 1:1 dilution was cheaper than the corresponding conventional application by 34 percent. Only the sealer was more expensive than its corresponding GSA equivalent. The sealer was 25 percent more expensive.

Because the washcoat was not required for the low-polluting system, this cost was totally eliminated, thus resulting in approximately 36 percent of the total cost savings per 1000 ft². The cost of finishing materials was estimated to vary between 10 and 15 percent of the production costs. The low-VOC coatings used during the evaluations were 30 percent lower in cost per 1000 ft² than the conventional coating.

Personnel and Personnel Assignments. There were no additional workers assigned to the finishing room floor for the low-VOC coating trials, but there was an increase in work load. Personnel reassignments resulted in certain functions not being performed. Two floor inspectors had to spend nearly all of their time on either sanding or wiping and were not able to continuously fulfill their supervisory/inspection roles. Other reassignments did not result in deficiencies in other tasks performance.

If this system were to be used on a permanent basis, two or three additional workers would be necessary to free the inspectors to perform their usual duties. This would increase the labor force in the finishing room by a maximum of 6 percent. It was estimated the cost of labor for the entire operation to be 25 percent of the total operational expense. If the labor were to be increased by 6 percent, this would increase the total cost of the furniture produced by less than 2 percent.

Production Rates. Production rates for the low-VOC system were maintained at the normal levels. The two full days of production of the low-VOC buffets exceeded the daily production goal in dollars. Line speed was maintained once the initial adjustments were made for the introduction of the new coatings.

Equipment. There were no increases in costs due to new equipment requirements. All of the low-VOC coatings were applied with in-house equipment. The water-borne coating was not supplied from the pump house as a precaution against possible corrosion, but no equipment purchase was necessary. This evaluation of equipment costs cannot be generalized to include other plants or different water-borne systems.

Energy. There was no increase in the oven temperature during the low-VOC trial. The oven was maintained at approximately 110°F and the boosters were not used. There were no increases in energy costs due to use of the low-VOC coatings.

Analysis. There were no increase costs to the furniture manufacturer as a result of using low-VOC coatings. The small increase in labor cost was offset by the decrease in coating material cost. There were no other cost changes identified. A low-VOC coating system would be a more economical approach to lowering VOC's than pollution control devices, whose installation and operation would add to the cost of the conventional coating system.

Health and Worker Safety

The Material Safety Data Sheets (MSDS) were evaluated for major differences between the coating systems and are summarized in Appendix B. The MSDS must list any hazardous component present in an amount greater than 1.0% in a mixture of chemicals, and any carcinogen whose concentration is greater than 1.0%.

Since there is no estimate of worker exposure, no conclusion can be reached as to which system is more toxic or hazardous based on the above information alone. The low-VOC system does use fewer solvents and releases less of these solvents to the workplace atmosphere because they are by definition lower in VOC.

However, the grain raising caused by the water-borne coating required three employees to wipe down the furniture with naphtha (300 ppm TLV) after the filler was applied. This increased these workers' exposure to naphtha. There were worker complaints about eye and throat irritation when the catalyzed coatings were being used. The catalysts were para-toluenesulfonic acids and these are known to be mucous membrane irritants (1). However, there are no heavy metals listed in either system.

Worker Safety. All of the above components of both systems are considered to be inflammable liquids, Class 1B. There was no increase in safety hazards as a result of using the low-VOC system.

BIBLIOGRAPHY

- (1) Windholz, M.; Budavari, S.; Blumetti, R. and Otterbein, E. S.; The Merck Index, 10th Edition, Merck and Company, Inc., Rahway, NJ, 1983. p. 1364.

APPENDIX A

SHIPPING INFORMATION

IDENTIFYING STAMP AND STENCIL FOR LOW-VOC BUFFETS

ARMY LETTER CONCERNING FUTURE TRACKING

APPENDIX A

SHIPPING INFORMATION

REQUISITION NUMBERS: WK4EN-4130-0010 QUANTITY: 500
WK4EN-4023-0016 QUANTITY: 500

SHIPPING ADDRESS: Family Furniture Warehouse
USMCA Mannheim
SVC Center Mannheim
Friedrichsfeld, Germany

CONTACT: Dieter Seidel

ADDRESS: Commander-in-Chief
Headquarters, U.S. Army Europe
Attention: AEAEN-H
D. SEIDEL
A.P.O. New York 09403

PHONE: 49-6221-577480
49-6221-577927
49-6221-576790

SHIPPING DATE	NUMBER SHIPPED
7/22/85	142
7/23/85	330
7/24/85	461
7/25/85	66
Total	999*

* One remains in warehouse as of 9/9/85 awaiting shipment.

WARRANTED ITEM IF DEFECTIVE CONTACT GSA

1-VOC

7105-00
- 449-2937

9861 6 1 700
GS-00F-76100
AA-H-001895B
UNITED GLOBE

Figure A-1

Identifying stamp and stencil on low-VOC buffets

Appendix A

HEADQUARTERS, UNITED STATES ARMY, EUROPE AND SEVENTH ARMY
OFFICE OF THE DEPUTY CHIEF OF STAFF, ENGINEER
HOUSING DIVISION
APO NY 09403-0108

AEAEM-E

8 October 1985

SUBJECT: Evaluation of Furniture Coating

United States Environmental Protection Agency
Air and Energy Engineering Research Laboratory (MD-34)
ATTN: Mr. Darwin
Research Triangle Park, N.C. 27711

Dear Mr. Darwin:

Reference our FONECON, 19 Sep 85, and your letter, 20 Sep 85, regarding subject. Upon receipt of your letter, I discussed the proposed action with Mr. Heinz Von Dungen, Chief, Centralized Furnishings Management Office (CFMO), Mannheim-Friedrichsfeld - the agency to which the buffets have been issued.

We agreed to use the following procedures. All buffets are marked "LVOC" and set aside in the warehouse for special handling and issuance. When a buffet is being issued from the "marked" stock, the occupant's hand-receipt will also be marked and flagged when placed in appropriate hand-receipt file. Any recheck during a later date should be easy to accomplish by just pulling those hand-receipt folders which are specially marked. It will give you all the necessary information (i.e., quarters address, occupants name, date of issuance of buffet, and condition when issued). This procedure is easier to monitor rather than assigning an inventory number to each item and keeping track of all future transactions.

If you have any questions regarding this setup, please contact Mr. Von Dungen. His mailing address and telephone number is as follows:

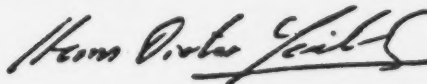
AEAEN-H

8 October 1985

CFMO Mannheim-Friedrichsfeld
ATTN: Mr. Von Dungen
USMCA Mannheim
APO NY 09086

When using military telephone: 380-7488. When using civilian telephone:
0621-730-7488.

Sincerely,



HANS-DIETER SEIDEL
Housing Supply Officer
Housing Division, ODCSENGR
HQ USAREUR & 7A

CF:

Cdr, USAISAE, ATTN: AEUES-CSS, APO 09169-5347

Cdr, 21st SUPCOM, ATTN: AEREH-H, APO 09325

Cdr, USMCA Mannheim, ATTN: AERM-EH-CFMO (Mr. Von Dungen), APO 09086

APPENDIX B

MATERIAL SAFETY DATA SHEETS

COATING MATERIALS

TABLE B-1. HAZARDOUS INGREDIENTS AND PHYSICAL DATA FOR
EVALUATED COATINGS: LOW-VOC GSA COATINGS

Source: Coating Manufacturer's Material Safety Data Sheet

	% weight	TLV ppm	LEL (%)	Vapor Pressure mm Hg
GSA Water-borne Toner/Washcoat Density = 7.54 lb/gal % Volatile by volume = 96				
Methyl Alcohol	43	200(1)	5.5	96.0
Catalyzed Sealer (3) Density = 7.75 lb/gal % Volatile by volume = 79%				
Xylene	40	100(1)	1.0	6.6
Butyl Alcohol	13	50(1)	1.7	4.0
Methyl Isobutyl Ketone	11	50	1.4	15.0
Methyl Amyl Ketone	9	50	1.1	2.1
Catalyzed Topcoat (3) Density = 7.65 lb/gal % Volatile by volume = 73%				
VM & P Naphtha	18	200	0.9	13.0
Toluene	8	100(1)	1.2	22.0
Xylene	4	100(1)	1.0	6.6
Butyl Alcohol	24	50(1)	1.7	4.0
Isobutyl Alcohol	10	50	1.2	8.8

- (1) Skin exposure
- (2) Not established
- (3) Does not include catalyst ingredients

TLV = Threshold Limit Value
LEL = Lower Explosion Limit

TABLE B-2. HAZARDOUS INGREDIENTS AND PHYSICAL DATA
FOR EVALUATED COATINGS: CONVENTIONAL GSA
COATINGS COMMON TO BOTH SYSTEMS

Source: Coating Manufacturer's Material Safety Data Sheets

	% weight	TLV ppm	LEL (%)	Vapor Pressure mm Hg
GSA Sap Stain Density = 6.74 lb/gal % Volatile by volume = 100%				
Methyl Alcohol	95	200(1)	5.5	96.0
Diethylene Glycol				
Monoethyl Ether	1	(2)	1.2	0.3
Ethylene Glycol	1	50	3.2	0.1

GSA Wiping Stain Density = 7.44 lb/gal % Volatile by volume = 88%				
Mineral spirits	30	200	1.0	2.0
VM & P Naphtha	16	200	0.9	13.0
Xylene	2	100(1)	1.0	6.6
Petroleum Hydrocarbon	31	200	0.5	0.5

GSA Shade Stain Density = 6.65 lb/gal % Volatile by volume = 100%				
Methyl Alcohol	32	200(1)	5.5	96.0
Ethyl Alcohol	51	1000	3.7	47.0
(Tecsol C-95)				
Ethyl Alcohol	12	1000	3.3	51.0
(PM 4083 ANH.)				
Diethylene Glycol				
Monobutyl Ether	3	(2)	0.9	1.0

(1) Skin exposure
(2) Not established

TABLE B-3. HAZARDOUS INGREDIENTS AND PHYSICAL DATA FOR
EVALUATED COATINGS: CONVENTIONAL GSA COATINGS

Source: Coating Manufacturer's Material Safety Data Sheets

	% weight	TLV ppm	LEL (%)	Vapor Pressure mm Hg
Vinyl Washcoat				
Density = 7.00 lb/gal, % Volatile by volume = 94.9%				
Aliphatic Naphtha	9.6	300	1.2	43.0
Toluol	13.1	100	1.2	22.0
Xylene	5.1	100(1)	1.0	6.6
Methanol	4.7	200(1)	5.5	96.0
Isopropanol	19.4	400	2.3	33.0
Isobutyl Alcohol	9.6	50	1.2	8.8
Isobutyl Acetate	20.7	150	1.4	15.0
Isobutyl Isobutyrate	5.0	(2)	1.0	3.2
Methyl Ethyl Ketone	4.9	200	2.0	70.0
GSA Toner				
Density = 6.63 lb/gal, % Volatile by volume = 99%				
Lactol Spirits	35	300	1.2	43.0
Toluene	4	100(1)	1.2	22.0
Methyl Alcohol	14	200(1)	5.5	96.0
Ethyl Alcohol (Tecsol C-95)	2	1000	3.7	47.0
Butyl Acetate	2	150	1.7	10.0
Isobutyl Acetate	4	150	1.4	15.0
Ethyl Acetate	8	400	2.0	86.0
Isobutyl Isobutyrate	4	(2)	1.0	3.2
Acetone	12	1000	2.6	186.0
Methyl Ethyl Ketone	12	200	2.0	70.0
Methyl Isobutyl Ketone	2	50	1.4	15.0
GSA Sealer				
Density = 7.10 lb/gal, % Volatile by volume = 89.3%				
Aliphatic Naphtha	18.5	300	1.2	43.0
Toluol	5.2	100(1)	1.2	22.0
Xylene	7.3	100(1)	1.0	6.6
Ethanol	9.2	1000	3.7	47.0
Isopropanol	3.4	400	2.3	33.0
Isobutyl Alcohol	6.4	50	1.2	8.8
Isobutyl Acetate	2.1	150	1.4	15.0
Isobutyl Isobutyrate	10.9	(2)	1.0	3.2
Methyl Ethyl Ketone	18.0	200	2.0	70.0

TABLE B-3. (Continued)

	% weight	TLV ppm	LEL (%)	Vapor Pressure mm Hg
GSA Lacquer				
Density = 7.55 lb/gal, % Volatile by volume = 85%				
VM & P Naphtha	6	200	0.9	13.0
Toluene	9	100(1)	1.2	22.0
Xylene	7	100(1)	1.0	6.6
Isopropyl Alcohol	4	400	2.3	33.0
Butyl Alcohol	7	50(1)	1.7	4.0
Isobutyl Alcohol	7	50	1.2	8.8
Butyl Acetate	29	150	1.7	10.0
Methyl Amyl Ketone	11	50	1.1	2.1
Diethyl Phthalate	2	(2)	(2)	(2)

- (1) Skin exposure
 (2) Not established

APPENDIX C

EXCERPT FROM APPLICABLE GSA SPECIFICATION

FOR FINISH SYSTEMS: AA-H-001895B (GSA-FSS)

APPENDIX C

EXCERPT FROM APPLICABLE GSA SPECIFICATION FOR FINISH SYSTEMS: AA-H-001895B (GSA-FSS)

4.4 Tests

4.5.1 Tests for lacquer and finish system. All the following tests, except U.V. test, shall be made on completely finished wood panels produced in accordance with the production procedures used in producing the furniture.

4.4.1.1 Alcohol. Age panel one week. Place 0.5 ml of 100-proof (50-percent) grain neutral spirits on the aged panel and trap for 2 hours with a watch glass. Remove glass and allow to evaporate. Light polishing of the area with a soft cloth must remove any whitening or spotting that developed.

4.4.1.2 Boiling water. Age panel one week. Pour 25 ml of boiling water on the leveled panel and allow to cool at room temperature. Dry the surface. After drying, there must be no graying or spotting.

4.4.1.3 Cold check. Age panel one week. Follow ASTM D1211 test procedure. After exposure to 10 cycles, there shall be no checking or cracking. True lacquer checking normally is one or more wavy or straight lines which cross the grain and do not appear related to grain structure. When a panel displays veneer checks, checks running parallel to the grain or glue line failure, the panel shall be disregarded and another panel tested.

4.4.1.4 Cold print. Age panel 48 hours. A 2- by 2-inch (approximately) piece of duck material (canvas), 8.25 oz/yd², minimum count 60 by 58 yarns per inch, shall be placed on the panel. Place a 1-lb weight on the material for 24 hours at 75°F. Bottom (contact surface) of the weight shall be flat and have a 1.128-inch diameter (1 in²). After the weight is removed, light polishing with a soft cloth and liquid polish must remove any imprint.

4.4.1.5 Hot print. Follow cold print test procedure with the following exceptions:

- a) Weight is 1/2 lb instead of 1 lb.
- b) Temperature during test is 110°F instead of 75°F.

4.4.1.6 Ultraviolet light resistance. Spray one-half of a 6- by 9-inch white porcelain panel with two coats of the lacquer to be tested. Allow panel to air dry for at least 18 hours. Place panel 12 inches from a carbon arc lamp enclosed by a Corex D glass globe, and expose for 24 hours. After exposure, spray the other half of the panel in the same manner and allow to air dry for at least 4 hours. Compare the two finishes. There shall be no more than a slight darkening of the arc lamp exposed film.

4.4.1.7 Toughness and adhesion. The test for toughness and adhesion shall be made by using Bell Hardness Tester, Model No. 1001 (see 6.5) in accordance with manufacturer's instructions. The panel shall be marred both parallel and perpendicular to the grain. The resulting indentation shall show no whitening which is evidence of film separation. The film shall conform to the contour of the indentation and shall not crack in a brittle manner in or along the indentation.

APPENDIX D

OBSERVATION WORKSHEETS

MANUFACTURING PROCESS OBSERVATIONS

LINE SPEED OBSERVATIONS

WORKSHEET 1
LOW-VOC COATINGS PROJECT
MANUFACTURING PROCESS OBSERVATIONS

DATE: _____

OBSERVED BY: _____

OPERATION NAME: _____

NAME OF COATING: _____

LOW VOC _____ CONVENTIONAL VOC _____

HOW SUPPLIED: _____

BEGINNING QUANTITY MEASUREMENT: _____

ENDING QUANTITY MEASUREMENT _____

AMOUNT USED _____ TO COAT _____ PIECES@ _____ SQ. FT

(TO BE FILLED IN LATER—INFORMATION FROM COATING MANUFACTURER)

(% VOC _____ % SOLIDS _____ % WATER _____)

EQUIPMENT USED TO APPLY COATING: _____

BRAND NAME _____ TIP NUMBER _____

PRESSURE USED _____ RECIRCULATING? _____
(if applicable)

CONTROL EQUIPMENT _____
(if applicable)

PRECEDING STEP: _____

FOLLOWING STEP: _____

ANY MANUAL STEPS? _____

DRYING TIME: _____

Revision No.2 7/10/85 Page 1 of 2

WORKSHEET 1 (cont.)

DRYING CONDITIONS: _____

OVEN OR HEAT APPLICATION: _____

AIR MOVEMENT: _____

APPROX. AMBIENT TEMP. & HUMIDITY _____

LINE PRODUCTION SPEED: _____

NO. OF WORKERS PERFORMING STEP: _____

SKILL LEVEL OF WORKERS: _____ YRS. EXP. _____

ADDITIONAL TRAINING: _____

USUAL LINE POSITION _____ WORKER INT. _____

WORKER COMMENTS: _____

GENERAL APPEARANCE _____

PROBLEMS ENCOUNTERED: _____

GENERAL OBSERVATIONS AND COMMENTS: _____

SUPERVISOR CLOSING COMMENTS AND OBSERVATIONS: _____

PRODUCTION RATE CHANGES? _____

PERSONNEL ASSIGNMENTS CHANGES? _____

(TO BE CALCULATED)

AMOUNT OF COATING PER PIECE USED: _____

SURFACE AREA COATED PER PIECE: _____

AMOUNT OF COATING PER 1000 SQ. FT. _____

AMOUNT OF VOC PER 1000 SQ. FT. _____

COST _____ COST PER 1000 SQ. FT. _____

WORKSHEET 2

LINE SPEED OBSERVATION SHEET

DATE: _____

OBSERVED BY: _____

TYPE OF COATINGS BEING APPLIED: _____

LINE SPEED IN PIECES FINISHED PER 5 MINUTES

TIME	NO. PIECES/5 MIN.
7: ____ AM	_____
8: ____ AM	_____
9: ____ AM	_____
10: ____ AM	_____
11: ____ AM	_____
12: ____ PM	_____
1: ____ PM	_____
2: ____ PM	_____
3: ____ PM	_____
4: ____ PM	_____

LINE STOPPAGES: _____

SCHEDULED BREAKS: _____

APPENDIX E

PHOTOGRAPHS OF THE LOW-VOC PROCESS

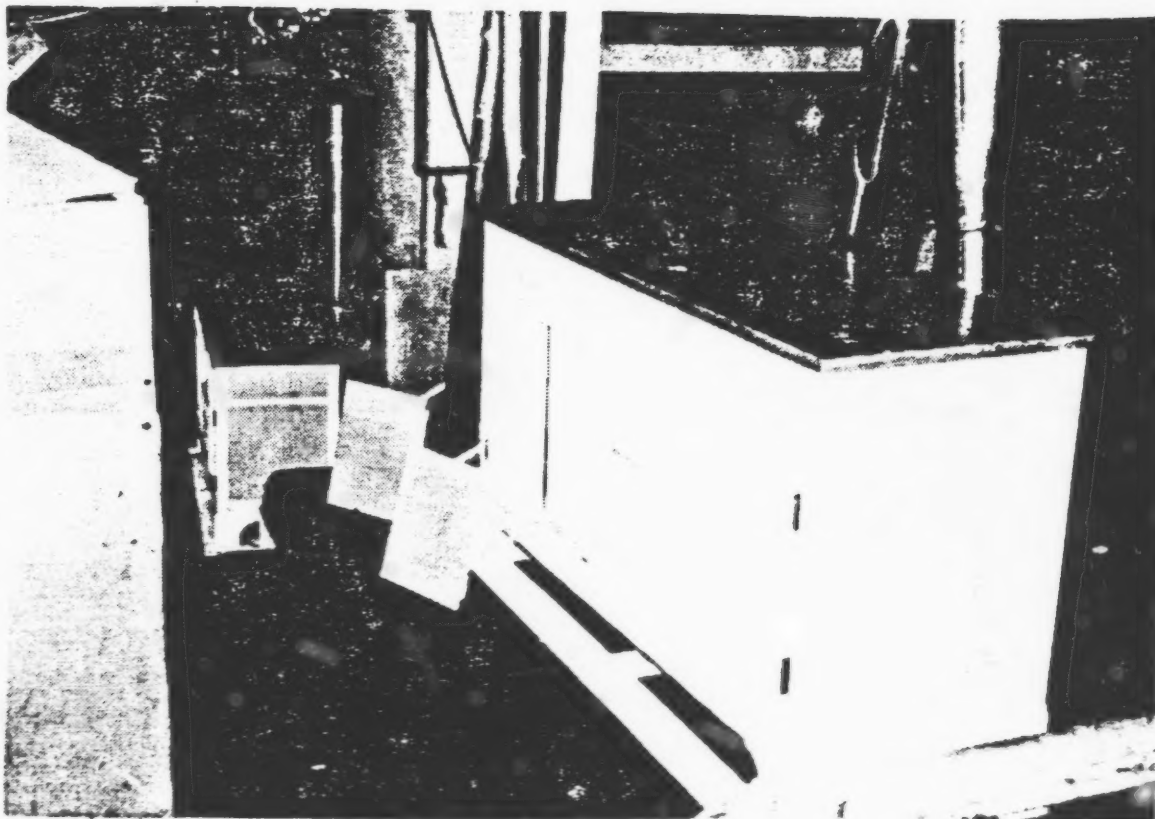


Figure E-1

The buffets are loaded and descend into the finishing room for the low-VOC coating trials.

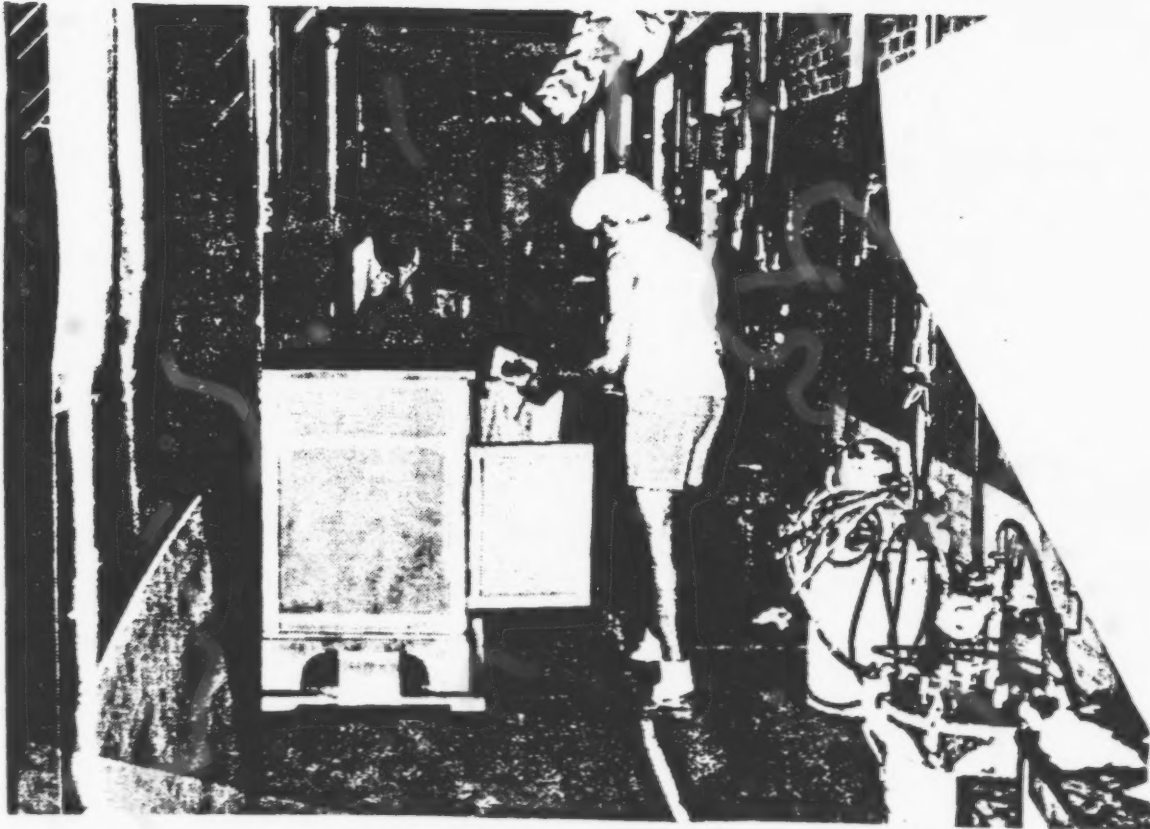


Figure E-2

Application of the first layer, the sap stain.

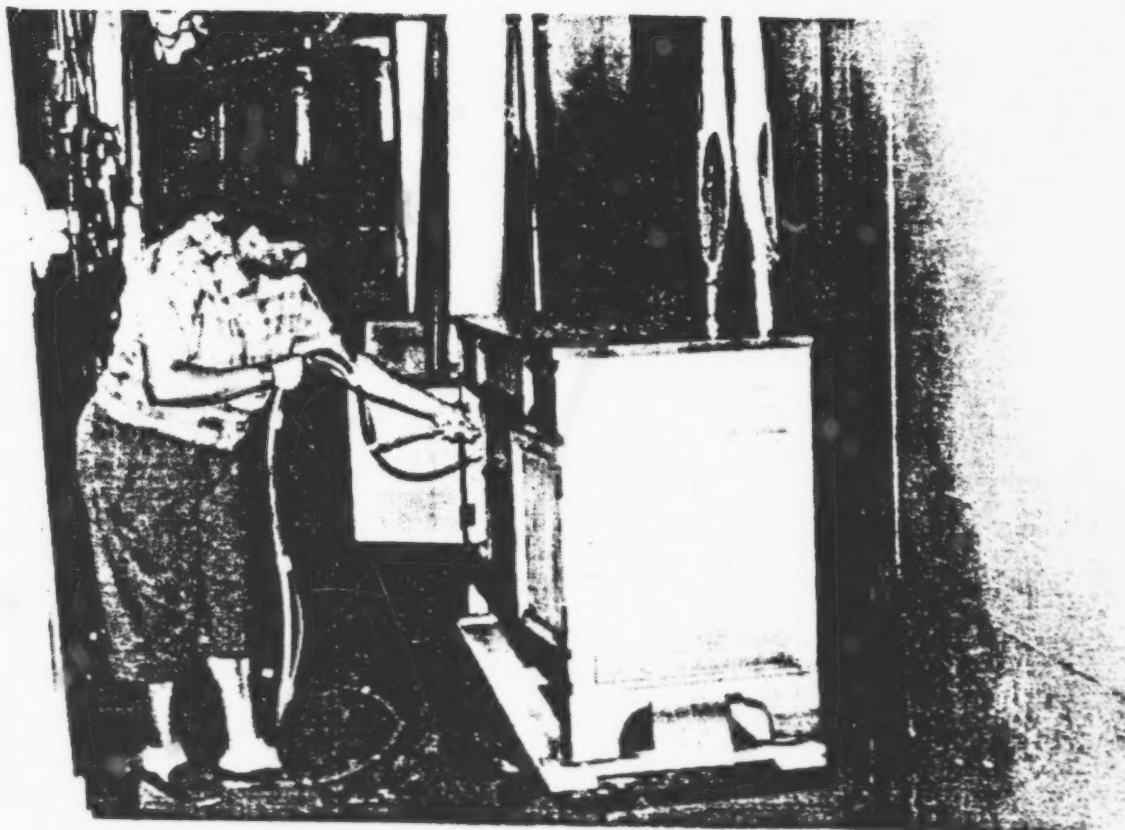


Figure E-3

Application of Hytone, the water-borne coating.

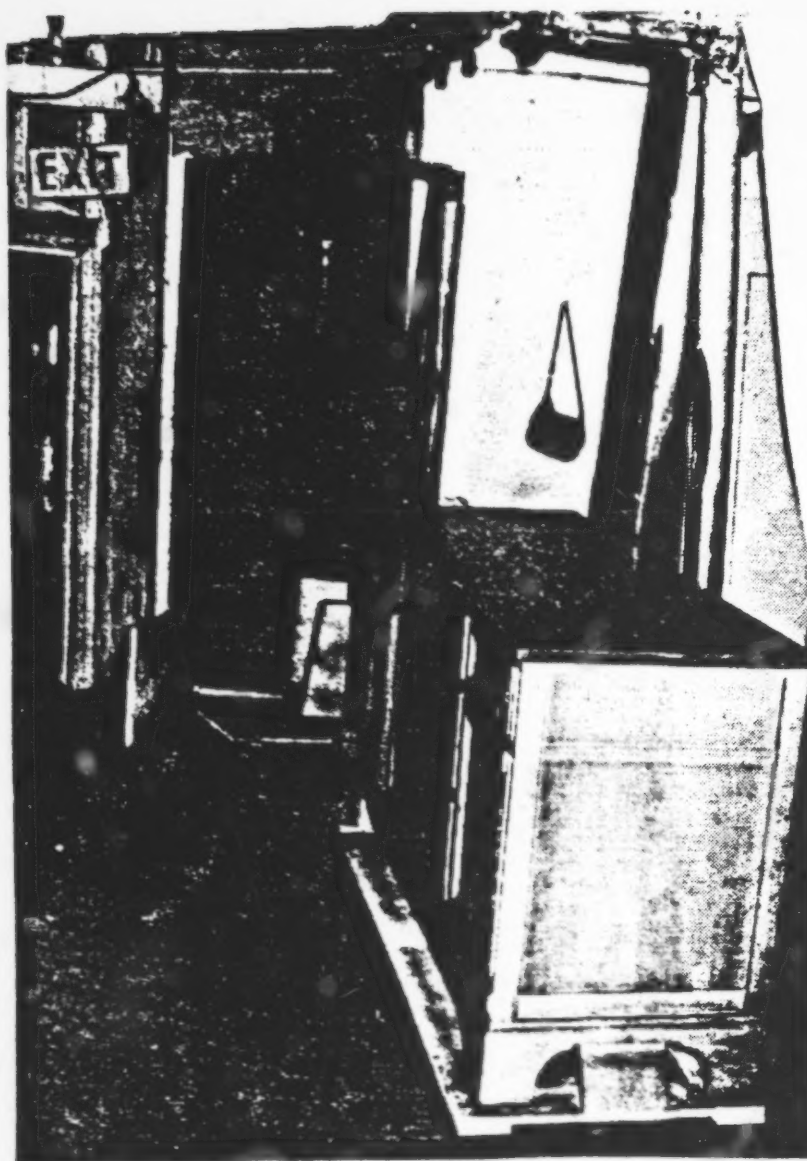


Figure E-4

The buffets, coated with sap stain and Hytone, enter the oven
for the first drying period.

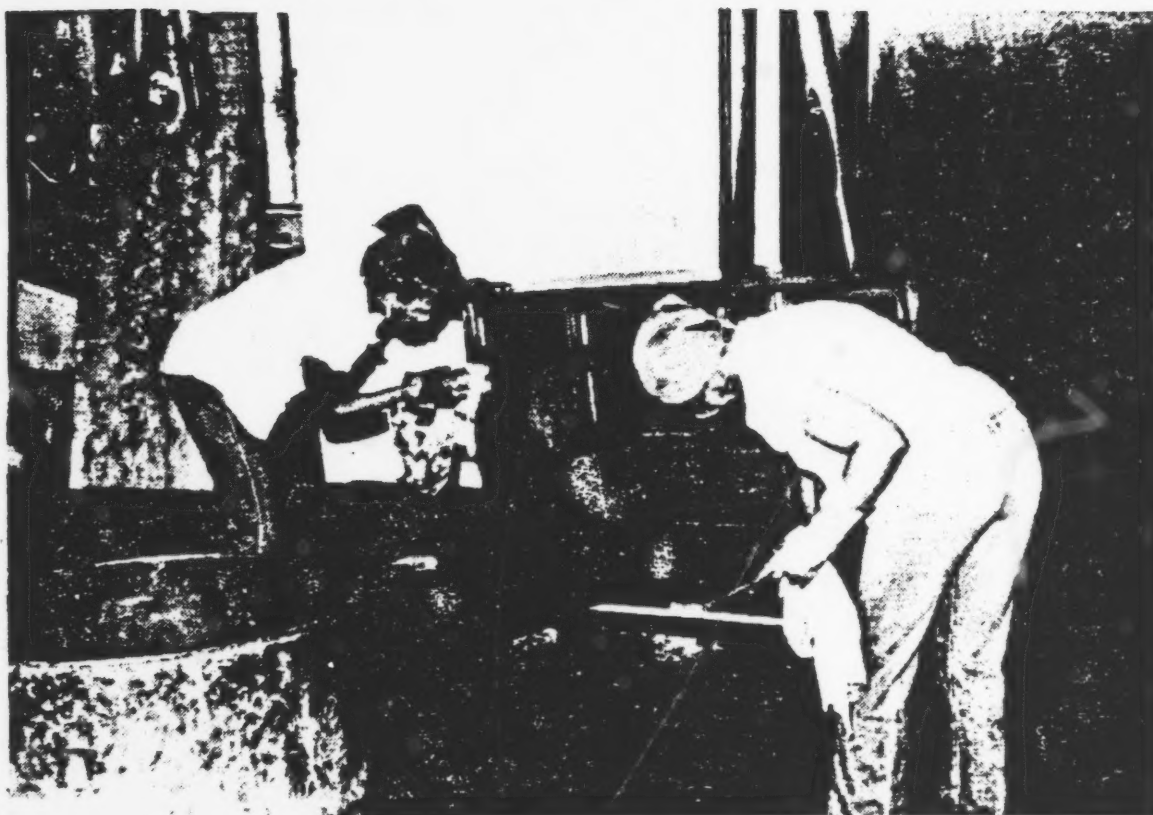


Figure E-5

The filler (wipe stain) is applied and wiped. All of the color layers are now on the buffets.



Figure E-6

The catalyzed sealer is applied.



Figure E-7

The catalyzed topcoat is applied. Note the cloud of spray formed.

APPENDIX F

COATING ANALYSIS

EPA LABORATORY RESULTS -- METHOD 24

APPENDIX F
COATING ANALYSIS

EPA LABORATORY RESULTS -- METHOD 24

MANUFACTURER'S CODE	COATING NAME	% WEIGHT VOLATILES	DENSITY KG/L
421-3596	Sap Stain	97.8	0.8068
423-5101	Hytone	42.3	0.9443
425-1494	Wipe Stain	83.4	0.8526
424-0460	Shade Stain	99.0	0.8034
479-0406	Chemgard Sealer	71.0	0.9308
479-0406 490-9258	Chemgard with Catalyst	73.9	0.9298
431-0158-20	Chemveer Lacquer	64.5	0.9164
431-0158-20 490-9265	Chemveer with Catalyst	68.0	0.9148
488-6749	Clearstone	97.6	0.7942
472-1195	Washcoat	92.5	0.8342
472-1192	Sealer	82.9	0.8652
471-1219-10	Lacquer	78.9	0.9025

APPENDIX G

GSA SOLICITATION



Notice Concerning Solicitation



A-FSS-1B (4/84)

SOLICITATION NO. RFP-A7-1673-A-10-1-84

DEFINITE QUANTITY CONTRACT
FOR

FSC CLASS 7105 - HOUSEHOLD AND QUARTERS FURNITURE, WOOD, TRADITIONAL STYLE

ANY INFORMATION THAT MAY BE DESIRED ON THIS PARTICULAR SOLICITATION
CAN BE OBTAINED FROM THE ISSUING OFFICE ADDRESS SHOWN HEREIN.

(THIS NOTICE SHOULD BE REMOVED BEFORE OFFER IS SUBMITTED TO GSA)

A-FSS-2 (4/84)

SIGNIFICANT CHANGES: The attention of offeror is invited to the following changes made since the issuance of the last solicitation for the supplies covered herein:

1. Contracts resulting from this solicitation will be covered by the new Federal Acquisition Regulation (FAR) which became effective on April 1, 1984. The FAR replaces the Federal Procurement Regulation (FPR).
2. All clauses have been renumbered and rearranged. Bidders are cautioned to read and become familiar with this solicitation prior to submission of an offer.
3. New revisions to the Interim Federal Specification covering items included in this solicitation.
4. Contracts awarded under this solicitation covering the Dining Room Grouping will contain a requirement for a low polluting finish to be utilized on a portion of the buffet requirements. Technical requirements for the low polluting finish are included in this solicitation.

A-FSS-4 (4/84)

SOLICITATION COPIES: To reduce costs, only a single copy of this solicitation is mailed to addressees on our bidders mailing list, except that complete bid sets are furnished to active bidders who responded to previous solicitations for similar commodities. If additional copies are required (see Block 9, page 1, for number of bid copies to be submitted), you may reproduce them yourself, provided they are complete in every respect, or you may obtain them from the GSA Business Service Center, 7th & D Streets, SW, Washington, DC 20407.

A-FSS-6 (4/84)

BAR CODE MARKING: Bidders are cautioned that all contracts for stores stock items, including direct delivery shipments to military activities, are required to have Bar Code Marking as set forth in the solicitation. Copies of Federal Standard No. 123D, Change Notice 4, dated July 20, 1982, have been mailed to all concerns on the GSA Bidders Mailing List. If you did not receive a copy, please contact the GSA Business Service Center that is nearest to your geographical location or request a copy from the GSA Specifications Unit, Room 6039, 7th and D Streets, SW, Washington, DC 20407, Telephone (202) 472-2205 or 2140.

(CONTINUED ON REVERSE)

GSA Form 1602 (Rev. 6-84)

A-FSS-50 (4/84)

NOTICE: REQUESTS FOR EXPLANATION OR INFORMATION (see Para. 4 of GSA Form 3501 or 3502, as applicable.) Oral or written requests for explanation of information regarding this solicitation should be directed to:

GENERAL SERVICES ADMINISTRATION (FNP-A)
WASHINGTON, DC 20406

or

Phone (person and number indicated in Block 10, page 1 of this solicitation).

IMPORTANT: DO NOT ADDRESS OFFERS, MODIFICATIONS, OR WITHDRAWALS TO ABOVE ADDRESS. USE ADDRESS IN BLOCK 8, SF 33, AND FOLLOW INSTRUCTIONS IN PARAGRAPH 4 OF GSA FORM 3501 OR 3502, AS APPLICABLE.

A-FSS-AA (4/84)

NOTICE OF BID OPENING DATE AND TIME: All bids/offers must be received in the place and by the date and time specified in Provision 9 of Standard Form 33.

(THIS NOTICE SHOULD BE REMOVED BEFORE OFFER IS SUBMITTED TO GSA)

SOLICITATION, OFFER AND AWARD		1. CERTIFIED FOR NATIONAL DEFENSE UNDER BDSA REG. 2 AND/OR DMS REG. 1		RATING		PAGE OF 1 63 PAGES	
2. CONTRACT NO. GS-00F-		3. SOLICITATION NO. FNP-A7-1673-A-10-1-84		4. TYPE OF SOLICITATION ☒ ADVERTISED (IFB) ☐ NEGOTIATED (RFP)		5. DATE ISSUED 8-30-84	
7. ISSUED BY General Services Administration Office of Federal Supply and Services		CODE		8. ADDRESS OFFER TO (If other than Item 7) General Services Administration Bid Room - IFB FNP-A7-1673-A-10-1-84 7th & D Streets, SW Washington, DC 20407			

NOTE: In advertised solicitations "offer" and "offeror" mean "bid" and "bidder".

SOLICITATION

9. Sealed offers in original and 1 copies for furnishing the supplies or services in the Schedule will be received at the place specified in Item 8, or if handcarried, in the depository listed in **BLOCK 8** until **1:30 p.m.** **10-1-84**
(Hour) (Date)

CAUTION - LATE Submissions, Modifications, and Withdrawals: See Section I, Provision No. 52.214-7 or 52.215-10. All offers are subject to all terms and conditions contained in this solicitation.

10. FOR INFORMATION CALL	A. NAME JUANITA C. BLASSINGAME	B. TELEPHONE NO. (Include area code) (NO COLLECT CALLS) (703) 557-5938
--------------------------	--	--

11. TABLE OF CONTENTS

(V)	SEC	DESCRIPTION	PAGE(S)	(V)	SEC	DESCRIPTION	PAGE(S)
PART I - THE SCHEDULE				PART II - CONTRACT CLAUSES			
	A	SOLICITATION/CONTRACT FORM	1		I	CONTRACT CLAUSES	52-58
	B	SUPPLIES OR SERVICES AND PRICES/COSTS	2-21	PART III - LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACH.			
	C	DESCRIPTION/SPECS /WORK STATEMENT	22-42		J	LIST OF ATTACHMENTS	
	D	PACKAGING AND MARKING	43-44	PART IV - REPRESENTATIONS AND INSTRUCTIONS			
	E	INSPECTION AND ACCEPTANCE	45-48		K	REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF OFFERORS	59-63
	F	DELIVERIES OR PERFORMANCE	49-50		L	INSTRS. CONDS. AND NOTICES TO OFFER	64
	G	CONTRACT ADMINISTRATION DATA	52		M	EVALUATION FACTORS FOR AWARD	64-65
	H	SPECIAL CONTRACT REQUIREMENTS	51				

OFFER (Must be fully completed by offeror)

NOTE: Item 12 does not apply if the solicitation includes the provisions at 52.214-16, Minimum Bid Acceptance Period.

12. In compliance with the above, the undersigned agrees, if this offer is accepted within _____ calendar days (60 calendar days unless a different period is inserted by the offeror) from the date for receipt of offers specified above, to furnish any or all items upon which prices are offered at the price set opposite each item, delivered at the designated point(s), within the time specified in the schedule.

13. DISCOUNT FOR PROMPT PAYMENT (See Section I, Clause No. 52.232-8)	10 CALENDAR DAYS	20 CALENDAR DAYS	30 CALENDAR DAYS	CALENDAR DAYS
	%	%	%	%

14. ACKNOWLEDGMENT OF AMENDMENTS (The offeror acknowledges receipt of amendments to the SOLICITATION for offerors and related documents numbered and dated	AMENDMENT NO	DATE	AMENDMENT NO	DATE

15A. NAME AND ADDRESS OF OFFEROR	CODE	FACILITY	16. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print)

15B. TELEPHONE NO. (Include area code)	15C. CHECK IF REMITTANCE ADDRESS IS DIFFERENT FROM ABOVE - ENTER SUCH ADDRESS IN SCHEDULE	17. SIGNATURE	18. OFFER DATE
	☐		

AWARD (To be completed by Government)

19. ACCEPTED AS TO ITEMS NUMBERED	20. AMOUNT	21. ACCOUNTING AND APPROPRIATION TO BE SHOWN ON ORDERS ISSUED UNDER THIS CONTRACT.

22. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified)	ITEM	23. NEGOTIATED PURSUANT TO ☐ 10 U.S.C. 2304(a) () ☐ 41 U.S.C. 252(c) ()

24. ADMINISTERED BY (If other than Item 7) CODE	25. PAYMENT WILL BE MADE BY CODE
ADMINISTRATIVE CONTRACTING OFFICER TO BE DESIGNATED AFTER AWARD.	SEE BLOCK 23

26. NAME OF CONTRACTING OFFICER (Type or print)	27. UNITED STATES OF AMERICA (Signature of Contracting Officer)	28. AWARD DATE

IMPORTANT - Award will be made on this Form, or on Standard Form 26, or by other authorized official written notice.

CONTINUATION SHEET

REF. NO. OF DOC. BEING CONT'D.
FNP-A7-1673-A

PAGE 2 OF 65

NAME OF OFFEROR OR CONTRACTOR

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	HOUSEHOLD AND QUARTERS FURNITURE, WOOD, TRADITIONAL STYLE: In accordance with Interim Federal Specification AA-H-001895B (GSA-FSS) dated January 1, 1980, and deviations at the end of this schedule of items.				
	<u>GROUP I</u>				
	BEDROOM				
	ULTIMATE DESTINATION - GERMANY				
1.	SIZE 1, HEADBOARD WITH FRAME, SINGLE, 39" wide, 39½" high -----				
	7105-00-449-2793				
	FOB _____ Port of Exportation (Offeror to specify)	6,086	EA		
	<u>Reqn. Numbers</u>				
	WK4E4D-4016-0001	250			
	WK4FSF-4013-0007	200			
	WK4TVM-4005-0053	200			
	W80X9L-4012-0019	300			
	WK4E4D-4013-0002	250			
	WK4TVM-4005-0156	350			
	W80X9L-4012-0018	250			
	WK4TVM-4005-0089	111			
	WK4FRL-4009-0016	200			
	WK4TVM-4011-0001	300			
	W80X9L-4012-0017	250			
	W80X9F-4011-0001	100			
	WK4TVM-4005-0123	300			
	WK4FSF-4009-0003	150			
	WK4E4D-4013-0001	200			
	WK4E4N-4023-0029	600			
	W80X9L-4033-0003	800			
	W80X9J-4025-0006	100			
	WK4TVM-3119-0074	250			
	WK4E4D-3256-0018	500			
	W80X9F-4026-0001	100			
	W80D1C-4030-0100	150			
	WK4BWM-3346-0001	50			
	W80X9J-3270-0015	50			
	W80A3F-3319-4014	75			

CONTINUATION SHEET

REF. NO. OF DOC BEING CONT'D.
FNP-A7-1673-A

PAGE 3 OF 65

NAME OF OFFEROR OR CONTRACTOR

ITEM NO.	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
2.	SIZE 2, HEADBOARD WITH FRAME, DOUBLE, 54" wide, 39½" high ----- 7105-00-449-2804 FOB _____ Port of Exportation (Offeror to specify)	5,494	EA		
	<u>Regn. Numbers</u> W80X9F-4026-0002 WK4E4D-3256-0017 WK4TVM-3119-0071 W80X9M-4019-0036 WK4E4D-4013-0004 WK4E4D-4016-0002 WK4TVM-4005-0158 W80X9L-4012-0022 WK4TVM-4005-0056 WK4E4D-4013-0005 WK4FSF-4009-0018 WK4TVM-4005-0092 WK4FRL-4009-0017 WK4FRL-4009-0048 WK4TVM-4011-0002 WK4FSF-4010-0002 W80X9K-4002-0002 W80X9E-4023-0011 W80XN6-4004-0003B W80X9L-4012-0021 W80X9L-4012-0020 W80X9J-3363-0012 W80X9E-4005-0016 WK4TVM-4005-0125 WK4E4D-4013-0003 W80X9L-4033-0004 W80X9J-3270-0016 W80X9M-4108-0010 W80A3F-3265-4020 W80X9J-4025-0007 W80X9K-4023-0009	100 250 250 108 200 200 350 200 200 100 150 111 200 200 250 150 100 200 100 150 150 75 100 300 200 500 50 100 100 250 100			
	NOTE: The headboard and frame must be shipped from the same facility at the same time.				

NAME OF OFFEROR OR CONTRACTOR

Page 108

CONTINUATION SHEET

REV. NO. OF DOC. BEING CONT'D.
FNP-A7-1673-A

PAGE 5 OF 65

NAME OF OFFEROR OR CONTRACTOR

ITEM NO.	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	DRESSER, DOUBLE (Continued)				
	<u>Reqn. Numbers</u>				
	WK4TVM-4005-0138	300			
	W80X9G-4004-0016	550			
	W80X9E-4023-0007	100			
	WK4E4N-4023-0034	300			
	WK4E4N-4130-0001	400			
	W80X9E-3255-0010	100			
	W80X9G-3255-0002	100			
	W80X9H-4023-0007	200			
	W80X9N-4025-0014	50			
	W80X9H-3249-0012	75			
	W80X9H-3256-0006	25			
	W80XN6-3258-A009	50			
	W80XN6-3269-A012	50			
	W80X9F-4026-0011	100			
	W80X9L-4033-0012	150			
	W80X9M-4108-0007	40			
	W80X9M-4019-0031	50			
	W80X9J-4025-0001	40			
	W80ESY-3266-0001	50			
	W80X9K-3256-0018	50			
	W80X9K-3256-0030	50			
	W80A3F-3265-4021	70			
	W80X9M-3258-0018	200			
	W80X9J-3270-0011	40			
	W80A3F-3319-4016	100			
	WK4E4V-3265-0014	100			
	W80X9M-4019-0032	25			
	W80X9M-4019-0033	50			
	W80X9M-4019-0034	25			
5.	SIZE 1, CHEST, three drawer, 36" wide, 20" deep, 31" high -----				
	7105-00-455-6926				
	FOB _____ Port of Exportation (Offeror to specify)	200	EA		
	<u>Reqn. Numbers</u>				
	WK4E4D-4013-0020	50			
	WK4E4D-4013-0022	50			
	WK4E4D-4013-0021	50			
	WK4E4D-4013-0023	50			

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ITEM NO.	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
6.	SIZE 2, CHEST, six drawer, 36" wide, 20" deep, 44" high ----- 7105-00-455-6935 FOB _____ Port of Exportation (Offeror to specify)	6,985	EA		
	<u>Regn. Numbers</u>				
	W80X9E-4005-0010	300			
	W80X9K-4024-0006	100			
	WK4E4D-4013-0025	50			
	WK4TVM-4005-0064	400			
	W80X9M-4003-0030	60			
	WK4E4D-4016-0015	100			
	WK4E4D-4016-0015	100			
	W80X9E-4023-0024	100			
	WK4E4D-4016-0016	100			
	WK4FRL-4009-0028	150			
	WK4TVM-4005-0101	222			
	WK4E4D-4016-0017	100			
	W80X9K-4024-0007	100			
	WK4FSF-4009-0006	100			
	W80X9M-4003-0028	60			
	W80X9N-4012-0011	50			
	W80X9M-4003-0029	60			
	W80X9M-4003-0027	60			
	W80X9K-4002-0008	200			
	W80X9L-4012-0010	210			
	W80X9J-4002-0003	47			
	W80X9F-4011-0006	150			
	WK4TVM-4005-0135	600			
	WK4E4D-4013-0024	50			
	W80X9G-4004-0014	350			
	WK4E4N-4023-0033	800			
	W80EVV-4026-0002	18			
	WK4FSF-4013-0010	150			
	WK4E4N-4130-0002	300			
	W80A3F-3265-4022	70			
	W80X9K-3256-0016	50			
	W80A3F-3319-4015	100			
	W80X9K-3256-0028	50			
	W80X9J-3270-0006	75			
	W80X9H-4023-0006	250			
	W80X9M-4019-0026	60			
	W80X9M-4019-0027	60			
	W80HYN-3265-1052	100			
	W80X9N-4025-0004	100			
	W80D1C-4030-0102	200			
	W80X9G-4034-0033	133			
	W80X9H-3249-0010	75			
	W80X9H-3256-0005	25			
	W80X9L-4033-0009	150			

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ITEM NO.	SUPPLIES / SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	CHEST, six drawer (Continued)				
	Reqn. Numbers				
	W80X9F-4026-0008	150			
	W80XN6-3269-A007	50			
	W80X9M-4019-0024	60			
	W80X9M-4019-0025	60			
	W80X9M-4108-0006	30			
	W80ESY-3266-0008	50			
7.	NIGHT STAND, one drawer, 22" wide, 14" deep, 23" high -----				
	7105-00-449-2839				
	FOB _____ Port of Exportation (Offeror to specify)	11,986	EA		
	Reqn. Numbers				
	W80X9J-3270-0018	50			
	W80ESY-3266-0002	50			
	W80HYN-3265-1051	100			
	W80X9G-4034-0023	700			
	W80D1C-4030-0104	200			
	WK4BWM-3346-0031	50			
	W80X9K-4024-0029	100			
	W80BD7-4025-0230	150			
	W80X9J-4025-0027	50			
	W80X9M-4108-0008	160			
	WK4E4N-4130-0003	1000			
	WK4BWT-3266-0002	400			
	W80X9F-4026-0023	300			
	W80X9H-3364-0006	250			
	W80X9N-4025-0001	50			
	W80X9M-4019-0069	50			
	W80X9M-4019-0070	54			
	W80X9M-4019-0071	50			
	W80X9M-4019-0072	50			
	W80X9M-4019-0073	43			
	WK4TVM-4005-0154	900			
	WK4E4D-4013-0076	100			
	WK4FSF-4009-0014	535			
	W80X9M-4003-0031	95			
	W80X9M-4003-0032	65			
	W80X9N-4012-0015	26			
	WK4FRL-4009-0035	400			
	W80X9M-4003-0033	50			
	WK4TVM-4005-0121	333			
	WK4E4D-4016-0057	100			
	WK4E4D-4016-0056	100			
	WK4TVM-4011-0028	300			
	WK4E4D-4016-0055	100			

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ITEM NO	SUPPLIES / SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	NIGHT STAND (Continued)				
	Regn. Numbers				
	WK4FRL-4009-0054	400			
	WK4E4D-4013-0079	50			
	W80X9K-4024-0030	100			
	W80X9E-4005-0018	500			
	WK4FSF-4010-0019	225			
	W80X9F-4011-0017	100			
	WK4E4D-4013-0080	50			
	WK4TVM-4005-0083	600			
	WK4TVM-4005-0187	1,050			
	WK4E4D-4013-0078	50			
	W80X9M-4003-0034	50			
	WK4E4N-4023-0032	1,800			
	WK4E4D-4013-0077	50			
8.	SIZE 1, WOOD FRAMED MIRROR, 26" X 36" ----- 7105-00-449-2885				
	FOB _____ Port of Exportation (Offeror to specify)	1,567	EA		
	Regn. Numbers				
	WK4TVM-4005-0190	200			
	WK4E4D-4013-0058	75			
	WK4E4D-4013-0059	75			
	WK4TVM-4005-0176	300			
	WK4E4D-4013-0060	75			
	WK4TVM-4005-0109	167			
	WK4TVM-4005-0143	300			
	W80X9J-4002-0006	50			
	WK4E4D-4013-0057	75			
	WK4ULH-3329-0116	50			
	WK4FRL-3121-0038	50			
	WK4UKH-3255-5A15	150			
9.	SIZE 2, WOOD FRAMED MIRROR, 30" X 44" ----- 7105-00-455-6936				
	FOB _____ Port of Exportation (Offeror to specify)	4,858	EA		
	Regn. Numbers				
	W80X9G-4034-0015	500			
	W80X9F-4026-0016	100			
	W80X9H-3249-0014	200			
	W80X9E-4023-0008	100			
	W80X9N-4025-0013	100			

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ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	WOOD FRAMED MIRROR, 30" X 44" (Continued)				
	<u>Reqn. Numbers</u>				
	W80X9K-3256-0031	50			
	W80X9K-3256-0019	50			
	W80A3F-3319-4001	100			
	WK4E4V-3265-0016	100			
	W80X9E-3255-0011	100			
	W80BD7-4025-0216	60			
	WK4E4N-4023-0035	300			
	WK4E4D-4013-0061	50			
	WK4TVM-4005-0144	300			
	W80X9E-4005-0005	100			
	WK4FSF-4009-0010	200			
	W80X9J-4002-0007	50			
	W80X9L-4012-0023	165			
	WK4E4D-4016-0032	100			
	W80X9M-4003-0021	50			
	W80X9M-4003-0022	50			
	W80X9M-4003-0023	50			
	WK4E4D-4016-0031	100			
	WK4FRL-4009-0014	100			
	WK4E4D-4016-0030	100			
	W80XN6-4004-0011B	50			
	W80X9K-4024-0016	100			
	WK4TVM-4005-0110	166			
	WK4FRL-4009-0027	100			
	WK4TVM-4011-0015	400			
	WK4E4D-4013-0064	50			
	W80X9M-4003-0026	67			
	W80X9K-4024-0015	100			
	WK4TVM-4005-0071	200			
	W80X9M-4003-0025	50			
	W80X9F-4011-0012	150			
	WK4E4D-4013-0063	50			
	W80X9M-4003-0024	50			
	WK4E4D-4013-0062	50			
	W80X9K-4024-0014	100			
	TOTAL GROUP I				

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ITEM NO.	SUPPLIES / SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	GROUP II				
	DINING ROOM				
	ULTIMATE DESTINATION - GERMANY				
10.	HUTCH, with adjustable shelves, two wooden doors in center, side areas open, 54" wide, 15-3/8" deep, 46" high -----				
	7105-00-080-6158				
	FOB _____ Port of Exportation (offeror to specify)	4,743	EA		
	<u>Reqn. Numbers</u>				
	W80X9G-4034-0009	150			
	W80X9J-3270-0005	100			
	W80ESY-3266-0005	50			
	W80A3F-3319-4006	25			
	W80X9K-3256-0008	150			
	WK4E4N-4023-0015	500			
	WK4E4D-4013-0026	50			
	WK4TVM-4005-0130	300			
	W80X9H-3364-0009	15			
	W80X9K-4002-0005	100			
	W80X9L-4012-0011	200			
	W80X9E-4023-0003	200			
	WK4E4D-4016-0020	50			
	WK4FRL-4009-0024	50			
	WK4E4D-4016-0019	50			
	WK4TVM-4005-0096	111			
	WK4E4D-4016-0018	100			
	W80X9K-4024-0039	50			
	WK4TVM-4005-0060	200			
	W80X9K-4024-0038	50			
	WK4TVM-4005-0163	127			
	W80X9F-4011-0009	100			
	WK4E4D-4013-0027	50			
	W80X9K-4024-0037	50			
	WK4FSF-4009-0008	100			
	WK4E4N-4130-0011	500			
	WK4TVM-3119-0079	200			
	WK4TVM-3256-0114	200			
	WK4ULH-3329-0112	20			
	W80XN6-4025-0003B	22			
	W80X9M-4019-0037	28			
	W80X9F-4026-0009	100			
	W80X9H-4023-0004	75			
	W80X9L-4033-0010	200			
	W80XN6-3258-A010	50			
	W80XN6-3269-A006	50			
	W80X9H-3249-0008	50			
	W80X9E-3255-0016	150			

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ITEM NO.	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	HUTCH (Continued)				
	Reqn. Numbers				
	W80X9G-3255-0004	120			
	W80X9G-3256-0008	50			
11 a.	BUFFET, five drawers, two cupboards, center drawer divided for silver, 54" wide, 20" deep, 31" high -----				
	7105-00-449-2937				
	FOB _____ Port of Exportation (Offeror to specify)	3,506	EA		
	Reqn. Numbers				
	W80XN6-3258-A004	50			
	W80XN6-3269-A005	50			
	W80X9H-3249-0006	100			
	W80X9E-3255-0015	150			
	W80X9G-3255-0003	40			
	W80X9G-3256-0007	50			
	W80X9M-4019-0010	28			
	W80X9J-4025-0009	50			
	W80X9J-4025-0034	25			
	WK4ULH-3329-0111	20			
	W80A3F-3319-4005	25			
	W80X9J-3270-0013	40			
	W80X9G-4034-0008	150			
	W80XN6-4025-0004B	22			
	W80X9L-4033-0006	200			
	W80X9H-4023-0003	100			
	W80X9H-4023-0008	3			
	W80X9H-3364-0008	15			
	WK4TVM-3119-0078	200			
	W80X9K-3256-0007	150			
	W80X9K-4024-0036	50			
	W80X9K-4024-0034	50			
	WK4TVM-4005-0161	127			
	WK4E4D-4013-0011	50			
	W80X9K-4024-0035	50			
	WK4TVM-4005-0058	200			
	WK4E4D-4016-0009	50			
	WK4TVM-4005-0094	111			
	WK4E4D-4016-0008	50			
	WK4FRL-4009-0023	50			
	WK4E4D-4016-0010	100			
	W80X9E-4023-0002	200			
	W80X9L-4012-0004	200			
	W80X9K-4002-0004	100			
	W80X9F-4011-0003	100			

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ITEM NO.	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	BUFFET (Continued)				
	<u>Reqn. Numbers</u>				
	WK4FSF-4009-0007	100			
	WK4E4D-4013-0010	50			
	WK4TVM-4005-0128	300			
	W80X9F-4026-0005	100			
11b.	BUFFET, five drawers, two cupboards, center drawer divided for silver, 54" wide, 20" deep, 31" high, WITH LOW POLLUTING FINISH (see pages 41 and 51)	1,000	EA		
	<u>Reqn. Numbers</u>				
	WK4E4N-4130-0010	500			
	WK4E4N-4023-0016	500			
	NOTE: The hutch and buffet must be manufactured in the same facility.				
12.	SERVER, one silver drawer with four dividers, lower area, two cupboard doors with one adjustable shelf, 36" wide, 20" deep, 31" high -----				
	7105-00-449-2947				
	FOB _____ Port of Exportation	2,722	EA		
	(Offeror to specify)				
	<u>Reqn. Numbers</u>				
	W80X9G-4034-0019	100			
	W80X9H-3256-0011	50			
	W80X9J-4025-0008	50			
	W80X9F-4026-0018	200			
	W80X9M-4019-0056	36			
	W80X9M-4019-0057	36			
	W80X9E-3255-0017	150			
	W80X9H-3249-0007	50			
	WK4E4D-4013-0065	25			
	WK4TVM-4005-0129	300			
	W80X9K-4002-0014	100			
	WK4E4D-4016-0039	50			
	WK4TVM-4011-0022	300			
	WK4E4D-4016-0038	50			
	WK4TVM-4005-0095	111			
	WK4E4D-4016-0037	50			
	WK4FRL-4009-0029	200			
	WK4E4D-4016-0036	50			
	WK4E4D-4013-0068	25			
	WK4TVM-4005-0059	200			
	WK4E4D-4013-0067	25			
	WK4TVM-4005-0162	350			
	W80X9K-4024-0020	100			
	WK4E4D-4013-0066	25			
	W80XN6-3258-A018	30			
	W80XN6-3269-A014	50			
	W80X9J-3270-0020	9			

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ITEM NO.	SUPPLIES SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
13.	TABLE, OVAL, EXTENSION, with two 18" leaves, 90" long, 29½" high. Dimensions without leaves 54" long, 42" wide, 29½" high. 7105-00-449-2980 FOB _____ Port of Exportation (offeror to specify)	5,663	EA		
	<u>Reqn. Numbers</u>				
	W80X9H-3249-0019	50			
	W80X9E-3255-0007	100			
	W80X9G-3250-0016	200			
	W80X9M-4019-0060	50			
	W80X9M-4019-0061	68			
	W80X9L-4033-0018	200			
	W80X9F-4026-0020	100			
	W80X9G-4034-0021	150			
	W80X9H-3256-0003	50			
	W80X9K-3256-0022	50			
	W80T26-4011-5003	8			
	W80T26-4046-5003	20			
	WK3UPL-3348-5003	20			
	W80X9N-4025-0007	100			
	W80A3F-3319-4019	50			
	W80X9M-3258-0012	200			
	WK4BWM-3346-0028	25			
	W80D1C-4030-0105	200			
	WK4E4D-3256-0021	150			
	WK4BWT-3272-0001	177			
	WK4BWT-3272-0004	35			
	WK2FPJ-3103-9007	10			
	WK4BWM-3298-0001	25			
	W80XN6-4025-0005B	100			
	W80X9L-3258-A024	120			
	WK4E4N-4130-0005	400			
	WK4E4D-3121-0015	100			
	W80X9E-4023-0012	200			
	WK4E4D-4013-0072	50			
	W80X9K-4024-0025	50			
	WK4TVM-4005-0184	350			
	WK4E4D-4013-0073	50			
	W80X9K-4024-0026	50			
	WK4TVM-4005-0080	200			
	WK4E4D-4013-0074	50			
	W80X9F-4011-0014	100			
	WK4FSF-4010-0017	100			
	WK4TVM-4005-0117	111			
	WK4E4D-4016-0047	50			
	WK4E4D-4016-0046	50			
	WK4E4D-4016-0044	50			
	WK4E4D-4016-0045	50			
	WK4FRL-4009-0032	80			

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ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	TABLE, OVAL, EXTENSION (Continued)				
	<u>Reqn. Numbers</u>				
	WK4FRL-4009-0002	20			
	W80X9N-4012-0005	50			
	W80X9L-4012-0024	44			
	W80X9E-4005-0012	100			
	W80X9J-3363-0007	50			
	WK4E4D-4013-0071	50			
	WK4TVM-4005-0151	300			
	WK4FSF-4009-0011	300			
	WK4E4N-4023-0013	400			
	TOTAL GROUP II				\$
	<u>GROUP III</u>				
	CHAIRS				
	ULTIMATE DESTINATION - GERMANY				
14.	CHAIR, without arms, 20" wide, 21-3/4" deep, 37 1/2" high -----				
	7105-00-449-2990				
	FOB _____ Port of Exportation (Offeror to specify)	24,771	EA		
	<u>Reqn. Numbers</u>				
	W80X9E-4005-0006	800			
	WK4TVM-4005-0134	2,100			
	WK4E4D-4013-0017	200			
	W80X9F-4011-0005	500			
	W80X9G-4004-0015	597			
	W80X9J-3363-0004	200			
	W80X9K-4002-0007	500			
	W80X9L-4012-0008	350			
	W80X9L-4012-0009	380			
	W80X9N-4012-0007	60			
	W80X9M-4003-0011	250			
	W80X9M-4003-0012	250			
	W80XN6-4004-0005B	200			
	W80X9E-4023-0001	1,500			
	W80XN6-4004-0006B	200			
	WK4FRL-4009-0003	80			
	WK4FRL-4009-0033	160			
	WK4TVM-4005-0063	3,000			
	WK4TVM-4005-0100	444			
	WK4FRL-4009-0053	160			
	W80X9K-4024-0003	500			
	W80X9K-4024-0002	500			
	W80X9M-4003-0014	200			

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ITEM NO.	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	CHAIR, without arms (Continued)				
	Reqn. Numbers				
	WK4E4D-4013-0019	200			
	W80XN6-4004-0007B	200			
	W80X9K-4024-0001	500			
	W80X9M-4003-0013	250			
	WK4E4N-4023-0014	3,800			
	WK4E4D-4013-0018	200			
	WK4E4D-4013-0016	200			
	WK4E4N-4130-0009	2,000			
	W80D1C-4030-0106	1,000			
	W80XN6-4025-0008	300			
	W80X9G-4034-0013	1,000			
	W80X9H-4023-0005	250			
	W80X9F-4026-0007	460			
	W80X9L-4033-0008	500			
	W80X9M-4019-0018	200			
	W80X9M-4019-0019	200			
	WK3UPL-3348-5005	80			
	W80XN6-4025-0007	300			
15.	CHAIR, with arms, 21-3/4" wide, 21-3/4" deep, 37 1/2" high -----				
	7105-00-455-6954				
	FOB _____ Port of Exportation	2,307	EA		
	(offeror to specify)				
	Reqn. Numbers				
	W80XN6-4025-0009B	200			
	WK4E4D-4013-0012	100			
	WK4TVM-4005-0061	400			
	WK4TVM-4005-0098	222			
	W80X9M-4003-0017	50			
	W80X9M-4003-0016	50			
	W80X9M-4003-0015	184			
	W80X9N-4012-0008	71			
	W80X9J-3363-0003	130			
	WK4E4D-4013-0015	100			
	WK4E4D-4013-0014	100			
	WK4E4D-4013-0013	100			
	WK4TVM-4005-0132	600			
	NOTE: Chair fabric color shall be in the beige to gold range.				
	TOTAL GROUP III				\$

CONTINUATION SHEET

REF. NO. OF DOC. BEING CONT'D.

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NAME OF OFFEROR OR CONTRACTOR

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	COFFEE TABLE (Continued)				
	Reqn. Numbers				
	W80ESY-3266-0003	50			
	W80X9M-3258-0017	200			
17.	TABLE, END, RECTANGULAR, 28" long, 20" wide, 21" high -----				
	7105-00-455-6974				
	FOB _____ Port of Exportation (offeror to specify)	8,738	EA		
	Reqn. Numbers				
	W80X9M-4108-0009	80			
	W80X9J-3270-0017	50			
	W80X9E-3255-0009	150			
	W80HYN-3265-1050	50			
	W80X9K-3256-0014	100			
	W80X9K-3256-0026	52			
	W80X9M-4019-0062	50			
	W80X9H-3249-0022	100			
	W80X9H-3256-0001	100			
	WK4ULH-3329-0122	40			
	W80X9G-4034-0022	500			
	WK4BWM-3346-0029	50			
	W80T20-4124-5003	24			
	W80X9J-4025-0029	100			
	W80X9L-4033-0019	100			
	W80X9M-4019-0063	86			
	W80X9M-4019-0064	50			
	W80X9M-4019-0065	64			
	W80X9M-4019-0066	50			
	W80X9M-4019-0067	40			
	W80X9M-4019-0068	40			
	W80X9N-4025-0003	50			
	WK4E4N-4130-0006	1,000			
	WK4E4D-4016-0048	100			
	W80X9E-4023-0016	300			
	WK4TVM-4005-0188	700			
	WK4FSF-4010-0018	300			
	WK4FSF-4009-0013	400			
	WK4TVM-4005-0084	400			
	W80X9F-4011-0015	200			
	WK4E4D-4016-0049	100			
	W80X9K-4024-0027	100			
	WK4TVM-4005-0122	222			
	WK4E4D-4016-0050	100			
	WK4TVM-4011-0026	300			
	WK4FRL-4009-0034	200			
	W80X9N-4012-0013	25			

CONTINUATION SHEET

REF NO. OF PLAN BRIT COMED
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PAGE 18 OF 65

ITEM NO.		QUANTITY	UNIT	UNIT PRICE	AMOUNT
END TABLE (Continued)					
<u>Regn. Numbers</u>					
W80X9K-4002-0016		200			
W80X9J-4002-0008		50			
W80X9J-3363-0008		100			
W80X9E-4005-0003		325			
WK4TVM-4005-0155		600			
WK4E4D-4013-0075		90			
WK4E4N-4023-0007		600			
W80X9M-3258-0021		150			
W80ESY-3266-0007		50			
W80X9F-4026-0021		200			
18.	TABLE, LAMP, square, 28" long, 28" wide, 21" high -----				
	7105-00-449-3044				
	FOB _____ Port of Exportation _____	250	EA		
	(offeror to specify)				
<u>Regn. Numbers</u>					
W80T26-4046-5001		20			
W80X9J-4025-0025		100			
WK4BWM-3346-0030		50			
WK4K9Z-3349-0019		20			
WK4NV2-3325-0008		60			
19.	TABLE, PIVOT TOP, 36" wide, 18" deep, 30-3/8" high (closed); 36" wide, 36" deep, 29 1/2" high (open) -----				
	7105-00-449-3050				
	FOB _____ Port of Exportation _____	1,081	EA		
	(offeror to specify)				
<u>Regn. Numbers</u>					
W80X9J-3270-0010		40			
W80X9J-4025-0026		50			
W80X9F-4026-0024		100			
W80X9M-4019-0076		50			
W80X9L-4033-0021		100			
W80X9M-4003-0038		25			
WK4E4D-4013-0082		25			
W80X9M-4003-0039		25			
W80X9E-4023-0028		15			
WK4E4D-4016-0061		50			
WK4TVM-4005-0119		111			
WK4E4D-4016-0060		50			

CONTINUATION SHEET

REF. NO. OF DOC. BEING CONT'D.

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OF

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NAME OF OFFEROR OR CONTRACTOR

ITEM NO.	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	PIVOT TOP TABLE (Continued)				
	Reqn. Numbers				
	WK4TVM-4011-0029	200			
	WK4FRL-4009-0015	40			
	WK4E4D-4016-0059	50			
	WK4E4D-4016-0058	50			
	W80X9M-4003-0036	25			
	W80X9M-4003-0037	25			
	W80X9M-4003-0035	25			
	WK4E4D-4013-0081	25			
	TOTAL GROUP IV				\$
	GROUP V				
	DESK AND BOOKCASE				
	ULTIMATE DESTINATION - GERMANY				
20.	DESK, double pedestal, with center drawer, plus two storage and one file drawer on each side, 48" wide, 24" deep, 29½" high -----				
	7105-00-449-3091				
	FOB Port of Exportation (offeror to specify)	4,580	EA		
	Reqn. Numbers				
	WK4E4D-4013-0029	50			
	WK4TVM-4005-0136	300			
	W80X9L-4012-0012	90			
	W80X9K-4002-0009	100			
	W80X9J-3363-0005	50			
	WK4E4N-4023-0012	500			
	WK4E4D-4016-0024	50			
	WK4E4D-4016-0023	50			
	WK4TVM-4011-0011	300			
	WK4E4D-4016-0022	50			
	WK4FRL-4009-0052	150			
	WK4FRL-4009-0012	50			
	WK4FRL-4009-0025	150			
	WK4E4D-4016-0021	50			
	WK4TVM-4005-0102	111			
	WK4E4D-4013-0033	25			
	WK4FSF-4010-0009	150			
	WK4E4D-4013-0032	25			
	WK4TVM-4005-0065	200			
	W80X9K-4024-0008	100			
	WK4E4D-4013-0031	50			
	WK4E4D-4013-0030	25			
	W80X9F-4011-0007	50			
	W80X9E-4005-0007	200			

CONTINUATION SHEET

REF. NO. OF DOC. BEING CONT'D
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NAME OF OFFEROR OR CONTRACTOR

ITEM NO.	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	DESK, DOUBLE PEDESTAL (Continued)				
	Reqn. Numbers				
	W80XN6-4004-0013	30			
	W80X9E-4023-0013	200			
	WK4FF5-3327-0016	35			
	W80D1C-4030-0103	300			
	WK4E4N-4130-0008	400			
	WK4E4D-4013-0028	25			
	W80YJ2-3315-0016	17			
	W80X9F-4026-0010	100			
	W80X9G-4034-0014	250			
	W80X9L-4033-0011	150			
	W80X9M-4019-0028	50			
	W80X9M-4019-0029	50			
	W80X9M-4019-0030	72			
	W80X9N-4025-0010	25			
21.	BOOKCASE, open, with two adjustable shelves, 42" wide, 13½" deep, 32" high -----				
	7105-00-449-3078				
	FOB _____ Port of Exportation (offeror to specify)	5,029	EA		
	Reqn. Numbers				
	W80X9K-4002-0003	150			
	W80X9F-4011-0002	200			
	W80X9F-4011-0002	200			
	WK4E4D-4013-0008	50			
	W80XN6-4004-0009	50			
	WK4TVM-4005-0127	300			
	WK4E4N-4023-0011	500			
	WK4E4D-4016-0007	100			
	WK4E4D-4016-0006	50			
	WK4FRL-4009-0051	150			
	WK4TVM-4005-0093	111			
	WK4FRL-4009-0022	150			
	WK4E4D-4016-0005	50			
	WK4TVM-4005-0057	200			
	WK4FSF-4009-0009	100			
	WK4E4D-4013-0009	50			
	W80X9E-4023-0015	200			
	W80X9K-4023-0010	100			
	WK4FSF-4010-0005	200			
	W80X9E-4005-0008	200			
	W80D1C-4030-0101	300			
	WK4E4N-4130-0007	400			
	WK4E4V-4023-0005	150			
	W80X9F-4026-0004	100			

CONTINUATION SHEET

REF. NO. OF DOC. BEING CONT'D.
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NAME OF OFFEROR OR CONTRACTOR

ITEM NO.	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	BOOKCASE (Continued)				
	<u>Regn. Numbers</u>				
	W80X9G-4034-0007	500			
	W80X9J-4025-0031	50			
	W80X9L-4033-0005	100			
	W80X9M-4019-0006	50			
	W80X9M-4019-0007	68			
	W80X9M-4019-0008	50			
	W80X9M-4019-0009	50			
	W80X9N-4025-0009	100			
	TOTAL GROUP V				\$

DEVIATIONS TO INTERIM FEDERAL SPECIFICATION AA-H-001895B (GSA-FSS) DATED
JANUARY 1, 1980.

Page 1

Group A - Bedroom

Item 2 - Dresser, Sizes 1, 2 and 3, delete: "32 high", substitute: "31 High".

Item 3 - Chest, Size 1, delete: "32 high", substitute: "31 high".

Size 2, delete: "45 high", substitute: "44 high".

Item 4 - Night Stand, delete: "24 high", substitute: "23 high".

Group B - Dining Room

Item 2 - Buffet, delete: "32 high", substitute: "31 High".

Item 3 - Server, delete: "32 high", substitute: "31 High".

Page 3

Add the following new paragraph:

"3.1.4.1 Artificial leather. The quality and weight of artificial leather shall be in accordance with Fed. Spec. CCC-A-680. Class, treatment, color, grain, and finish shall be as specified by the contracting officer (see 6.2(c))."

Page 4

Para. 3.1.6.4 Delete para. and substitute: "Table lock. Draw sash-type (see 6.4)."

Para. 3.1.6.7 Hinges. Delete second sentence and substitute: "One leaf of each hinge shall be mortised into the door, the other leaf shall be surface mounted to the case, and secured with six brass plated screws."

Page 5

Par. 3.1.8 Lacquer. Delete entire paragraph and substitute: "Finish top coat: Suitable natural or synthetic top coat, two coat process, with adequate "build", and a satin, closed pore finish, capable of passing all tests in par. 4.4.1."

Par. 3.1.10.1 Wood species. Column 2, "Exposed solid parts" add: "Pecan".
Column 2, "Exposed solid parts" delete: "Cherry"
and substitute: "Matoa(Sapindaceae Pometia)".

Para. 3.1.10.4 Hardwood plywood. Line 1, delete: "PS-51", substitute: "ANSI HP 1983". Line 2, delete: "good grade (1)", substitute: "B grade (B)".

Page 6

Table III. Delete all: "Good grade (1)" and substitute: "B grade (B)".
Delete all: "Utility grade (3)" and substitute: "Industrial grade (3)".

Para. 3.1.10.5 Delete: "Good grade (1)" and substitute: "B grade (B)".

Page 6 (continued)

Par. 3.1.11 Laminated plastic. Delete entire paragraph and deviations to this paragraph and substitute:

"3.1.11 Laminated plastic. Decorative face sheets for all top panels: Style D, type I, class 1, L-P-508, 0.050 inch thick, matching standard sample FSS-L-01006 walnut tone on mahogany (see 6.3). Backing sheet permitted for all items: Style ND, type IV, L-P-508, 0.030 inch thick. Backing sheets permitted for all items except oval extension table and flip top table:

0.030 $\pm$.003 inch GATOR PLY (see 6.4).

0.020 inch METRON backing sheet (Reichold Chemicals, Inc., Tacoma, WA 98401)

0.020 inch RESOBAK 184 back sheet (Pioneer Plastics, Auburn, ME 04210)

Adhesives for applying face and back sheets: See 3.1.2. Contact type adhesive not acceptable."

Para. 3.1.12 Hardboard. Line 1, delete: "Class 1, S1S of PS-58" and substitute "Class 2 (standard), S1S of ANSI A135.4-1982".

Page 7

Para. 3.2.2 Direction of grain. Line 1, after: "length" add: "(except dining table top where grain shall run perpendicular to the length.)"

Para. 3.2.4 Legs and posts. Line 2, after "post" add: "Back legs on dining room chairs shall be steam bent or cut from one solid piece of wood. Glued-up stock may be used if Figure 44 test is made during production, on every leg after it is bandsawed."

Para. 3.2.5.1 Drawers. Line 15, after: "Staples shall be driven flush" add: "Alternatively, bottom may be reinforced with a continuous bead of hot melt adhesive. Footnote 1/, delete: "NPA-4" and substitute: "ANSI-A208.2-1980".

Page 8

Para. 3.2.5.2 Drawer bearer frames and top frames. Line 3, after: "3/4 inch thick by" insert: "minimum". Line 10, delete: "3/2 inch" and substitute: "3/20 inch".

Para. 3.2.6 Doors. Line 2, delete: "NPA-4" and substitute: "ANSI-A208.2-1980".

Para. 3.2.7 Tops. Line 2, delete: "self edged" and substitute: "edged with PVC edgeband (0.030 $\pm$.003 inch) grained to match top."

Para. 3.2.8 Table, extension. Delete entire paragraph and deviations to this paragraph and substitute:

"3.2.8 Table, extension.

Leaves: two, 18 inch, without aprons.

Page 8 (Continued)

Table pins: plastic, 3/8 X 1 1/4 inch, four per joint, two positioned 6 inches (+ 1/64) left and right of centerline and two positioned 18 inches (+ 1/64) left and right of centerline, and centered vertically on the end of each panel. Leaves are intended to be interchangeable between tables made by different manufacturers.

Table eveners: (3.1.6.5) Locate one under each pin on table top.

Extension slides: (3.1.6.10) Attach to top with tapping screws.

Testing: Test according to 4.4.2.1 with all leaves installed. Allowable sag before and after test, 1/4 inch maximum. Allowable additional sag during test, 1/4 inch maximum (1/2 inch total sag maximum)."

Para. 3.2.11 Case backs. Delete entire paragraph and deviations to this paragraph and substitute:

"3.2.11 Case backs.

Night stand, hutch, buffet, server, and bookcase: 1/4 inch, min. 3 ply plywood (3.1.10.4). One piece construction. Plywood core may be any suitable material.

All other units (except desks): Min. 3/16 inch hardboard (3.1.12). One piece construction.

Attachment: Rabbet case ends. Attach back to case (including drawer frame rails, fixed shelves, and partitions) with No. 8 - 3/4 pan head tapping screws a maximum of 9 inches apart and one at each corner."

Page 9

Para. 3.2.13.2 Metal bed frame. Line 3, after: "All high impact plastic" add "with securely attached metal band around top of stem to prevent breakage".

Para. 3.2.14.1 Slip seats. Delete first sentence and substitute: "Slip seats shall have a 3/8-inch thick minimum, veneer core plywood (3.1.10.4), medium density fiberboard (48 lb. density, minimum), or 1/2 inch minimum particleboard (3.1.7) base with four 1/2 inch diameter vent holes."

Line 2, delete: "plywood" and substitute: "panel". Delete last sentence and substitute: "T nuts in seat base, and machine screws shall be used for fastening slip seat to chair. Plywood base may alternatively be attached with slotted or phillips head screws as illustrated.

Page 10

Add the following new paragraph:

"3.4.1 Hardware list. Items with drawer pulls, door knobs, escutcheons, hinges, leg ferrules, shelf supports, table extension slides, table locks, table eveners, etc., shall have a hardware parts list. List shall include: drawing of part, part name and manufacturer number, and name and address of part manufacturer. List shall be securely glued to an unexposed surface of each applicable item. List shall not be removeable after 4 hours without defacement.

Page 10 (Continued)

Para. 3.5 Workmanship. Line 5, after: "serviceability" add: "or cause personal injury to a user".

Page 15

Para. 4.4.2.1 Procedure. Line 3, delete sentence beginning with: "Place a 150 lb. load" and substitute: "Establish reference point at mid-point of table for measuring additional top deflection under load. Place a 150 lb., 18 inch diameter load in the center of the table for 30 minutes. Measure additional deflection under load."

Para. 4.4.3 Test for adhesives. In footnote 1/, lines 5 and 6, delete: "or" and substitute: "and".

Page 16

Add the following new paragraph:

"4.4.5 Test of apron bases and legs. Test all tables in accordance with ANSI Desk Product Test X5.5-1983, section 12 leg impact test. Test all places with apron bases in accordance with ANSI Desk Product Test 5.5-1983, section 12 leg impact test with the following changes: Increase leg impact weight from 6½ lb. to 15 lb. Impact bases as shown in figure 43. Use detail A for dressers, chests, nightstand, buffet, server, and bookcase. Use detail B for desk."

Page 17

Line 8, delete: "K897" and substitute: "K8197".

Under: "Metal bed frame" add: "Hickory Springs Mfg. Co.
P.O. Box 128
Hickory, NC 28601"

Para. 3.1.6.4 Table lock. Delete reference and substitute: "Edelen #466 or equal. Baltimore, MD 21205".

Figures

<u>Page</u>	<u>Figure</u>	
19	1	Night stand legs to be replaced with aprons, see details on page 25.
20	2A	Replace with new figure, Dresser.
21	3A	Replace with new figure, Dresser.
22	4A	Replace with new figure, Dresser.
23	5A	Replace with new figure, Chest.
24	6A	Replace with new figure, Chest.
25	7A	Replace with new figure, Night Stand.
26	8A	Replace with new figure, Buffet.
27	9A	Replace with new figure, Server.
	10	Change figure to indicate two 18 inch leaves.
29	11	Notes: Line 1, delete: "or glued and doweled."
35	17	Disregard leg section below apron rail.
38	20A	Replace new figure, base apron.
43	25	Disregard leg section below apron rail.

Figures (Continued)Page Figure

44	26A	Replace with new figure, base apron.
	29	After: "Removable 1/4 inch" delete: "oak".
50	32A	Replace with new figure, Dining Table.
Add 2 pages of apron details		
60	42	Full scale apron detail (new figure).
61	43	Full scale apron detail, section (new figure).
	44	Add new Figure 44 attached.

AA-H-001895B (GSA-FSS)

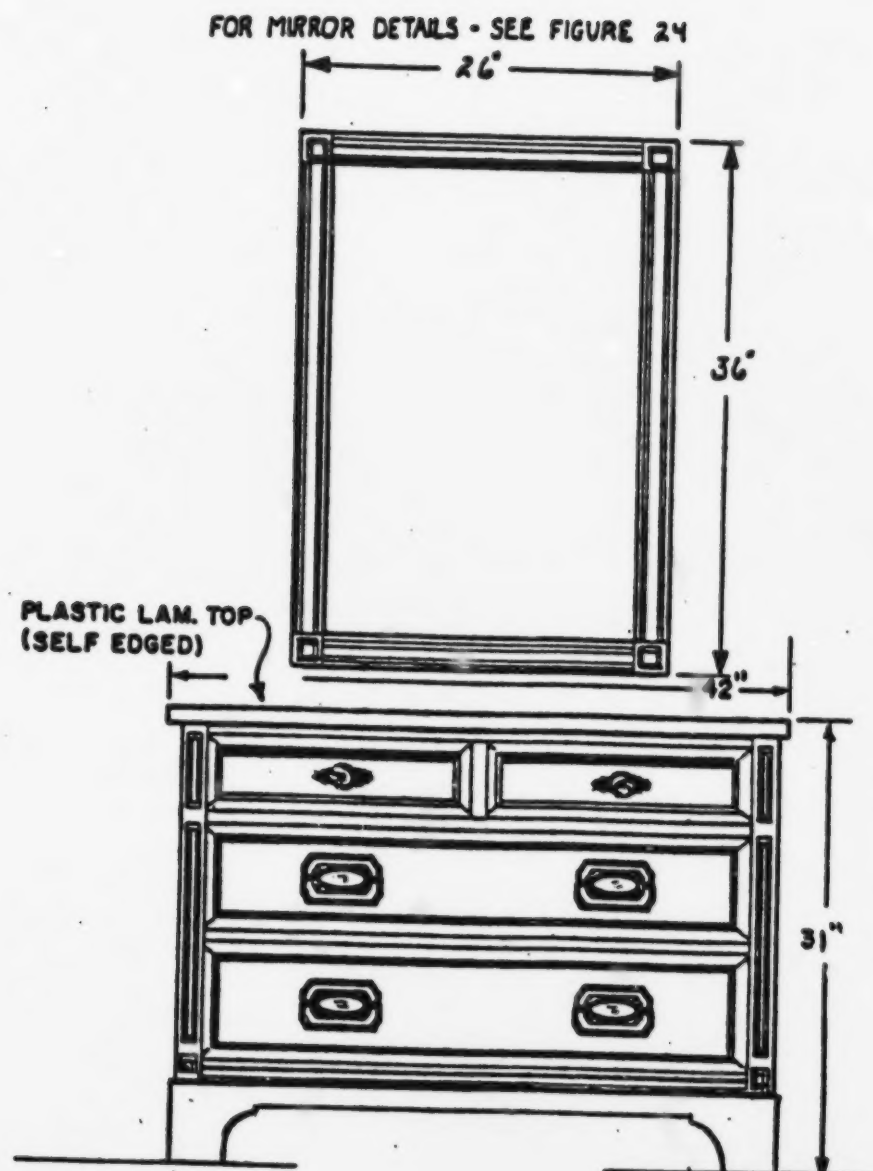


FIGURE 2A

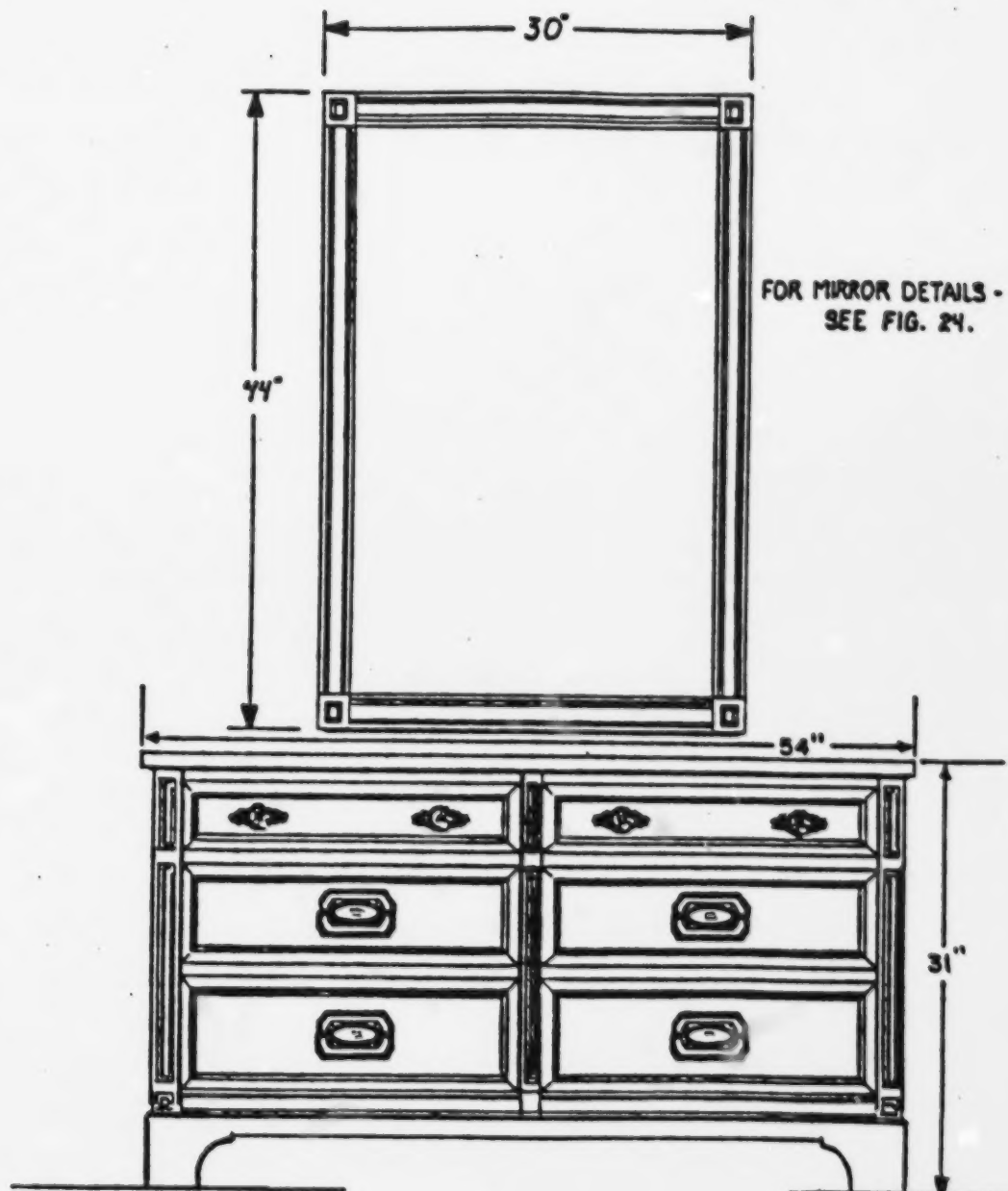


FIGURE 3A

AA-B-001895B (GSA-PSS)

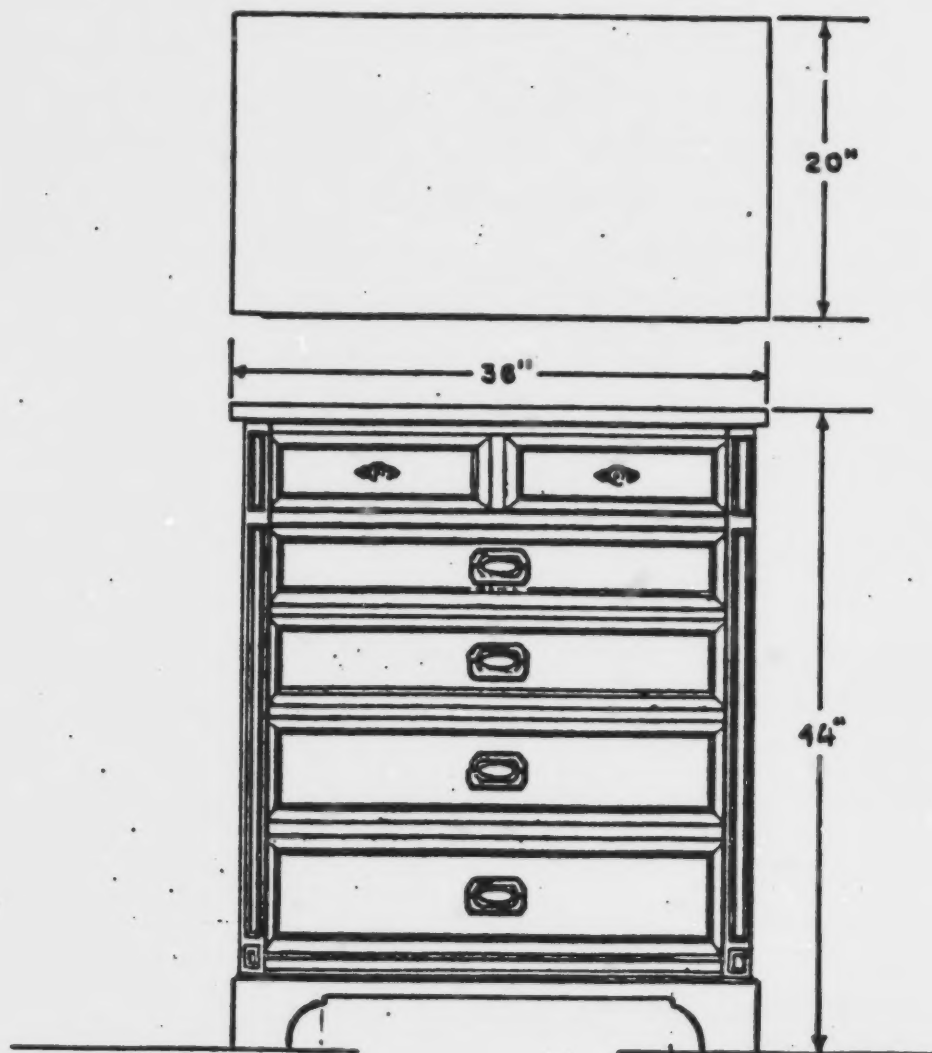


FIGURE 6A

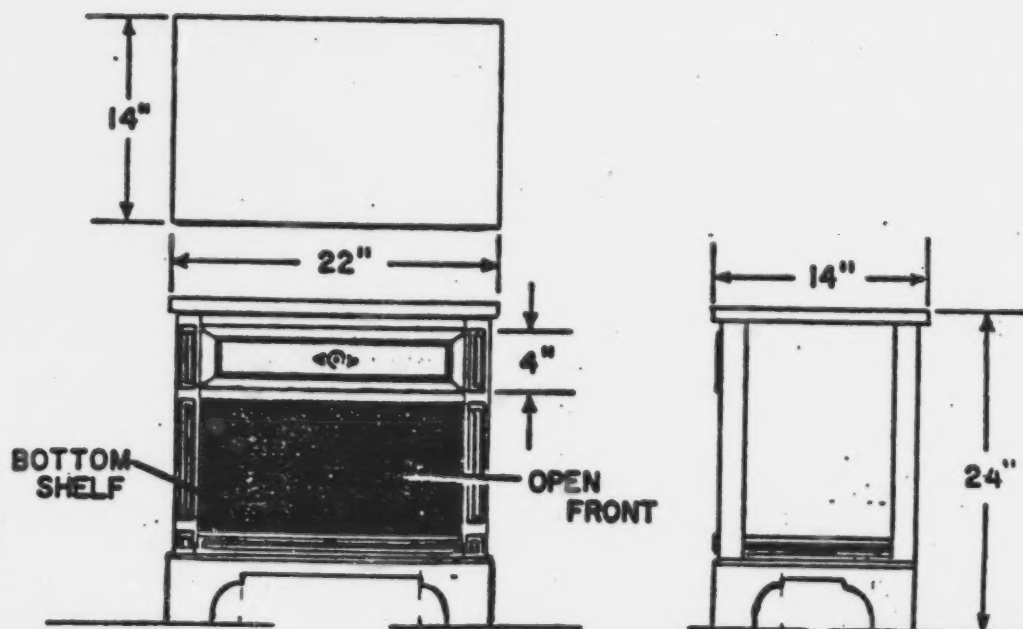


FIGURE 7A

AA-B-001895B (GSA-FSS)

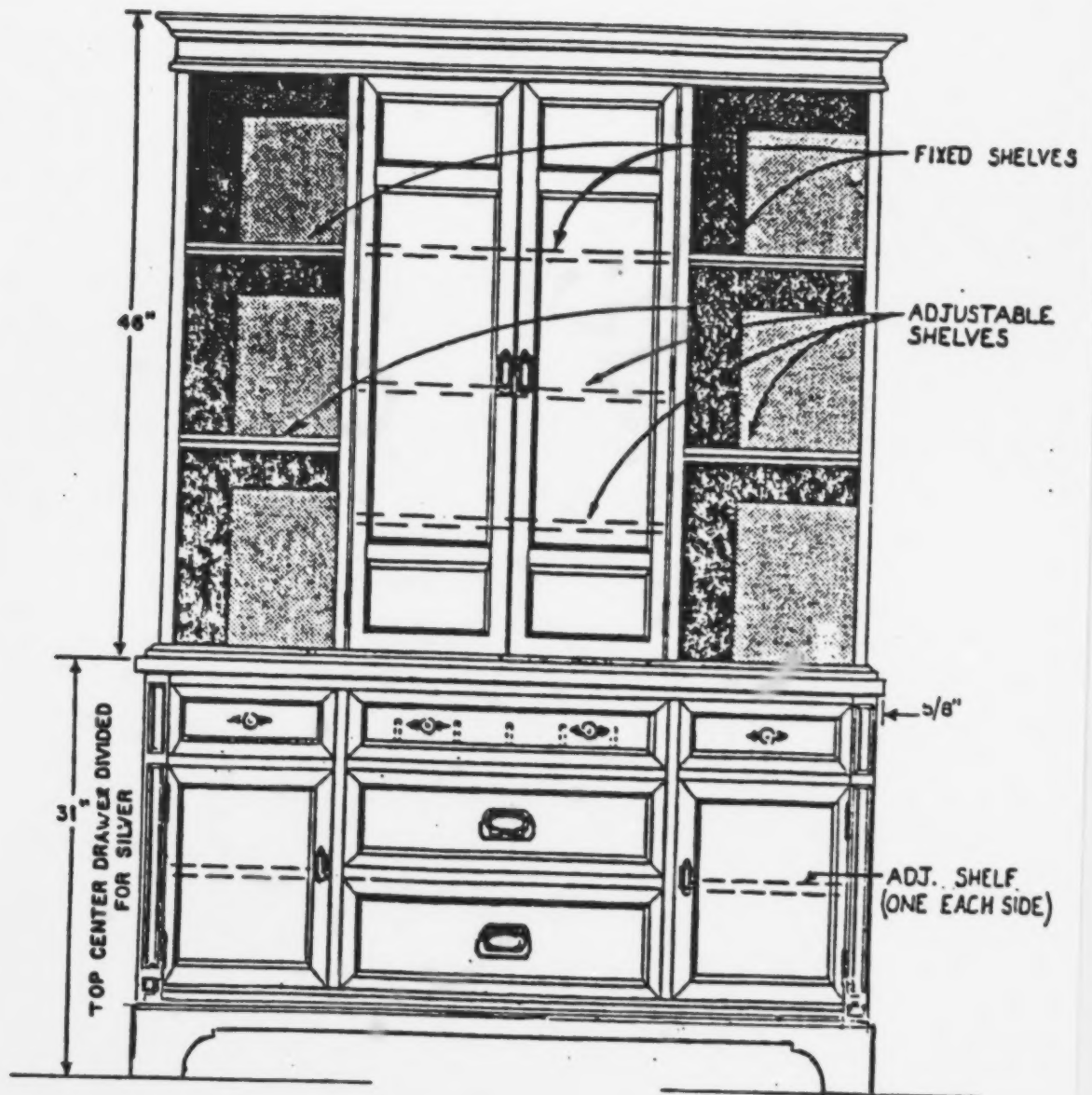


FIGURE 8A

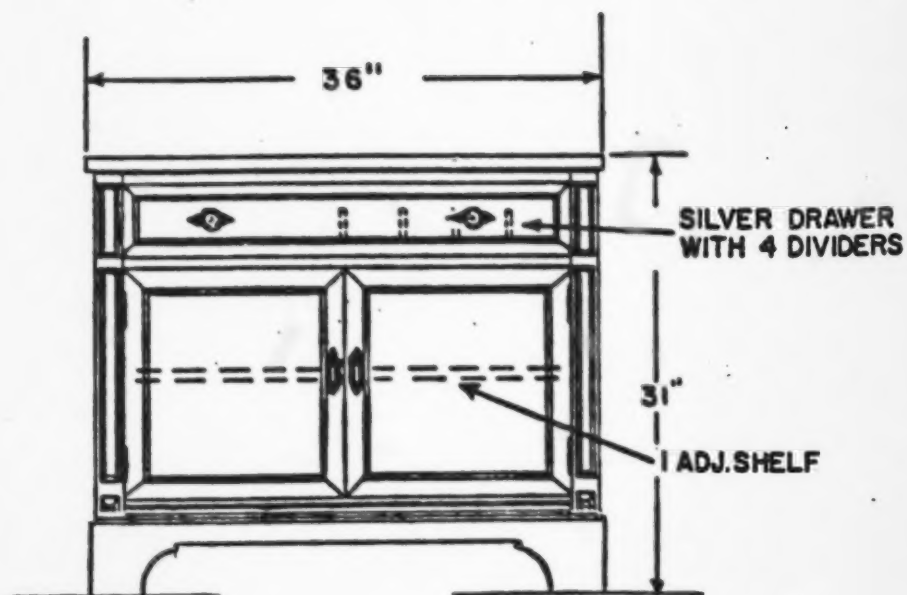
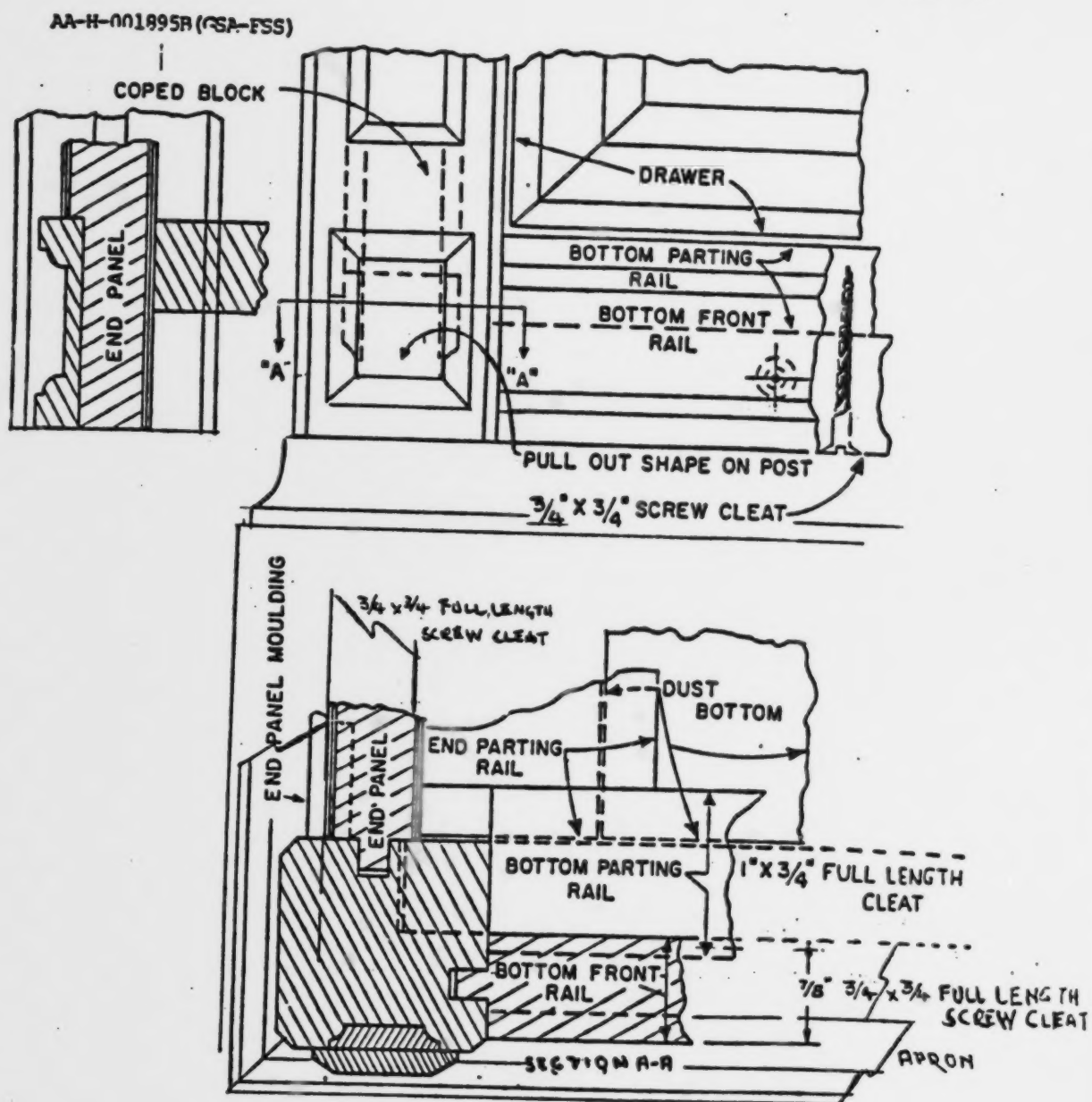


FIGURE 9A

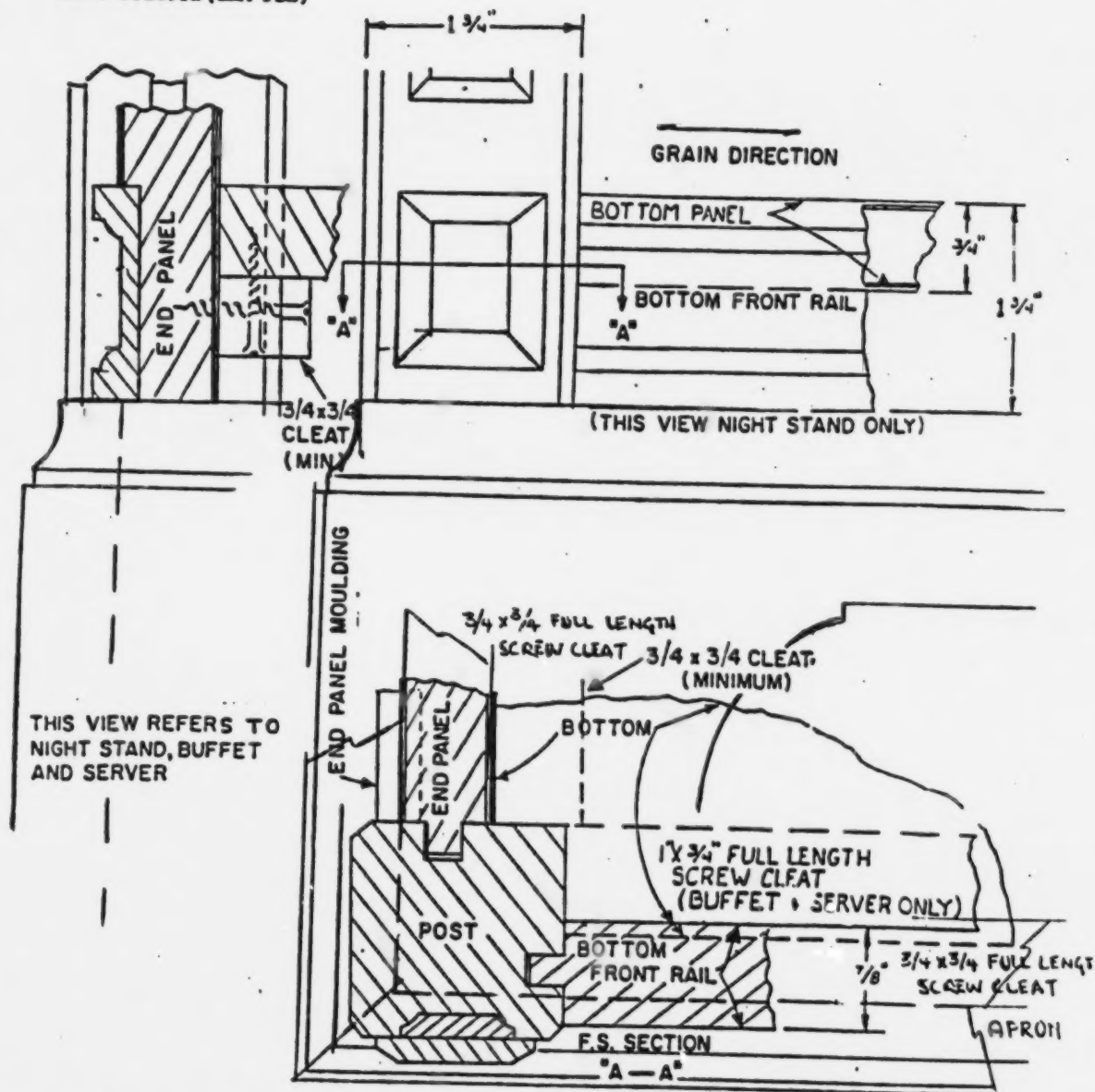


CORNER POST CONTINUOUS TO FLOOR

Figure 20A

TYPICAL SECTIONS OF DRESSER AND CHEST
NOT TO SCALE

AA-H-001895B (GSA-FSS)



CORNER POSTS CONTINUOUS TO FLOOR.

NOT TO SCALE

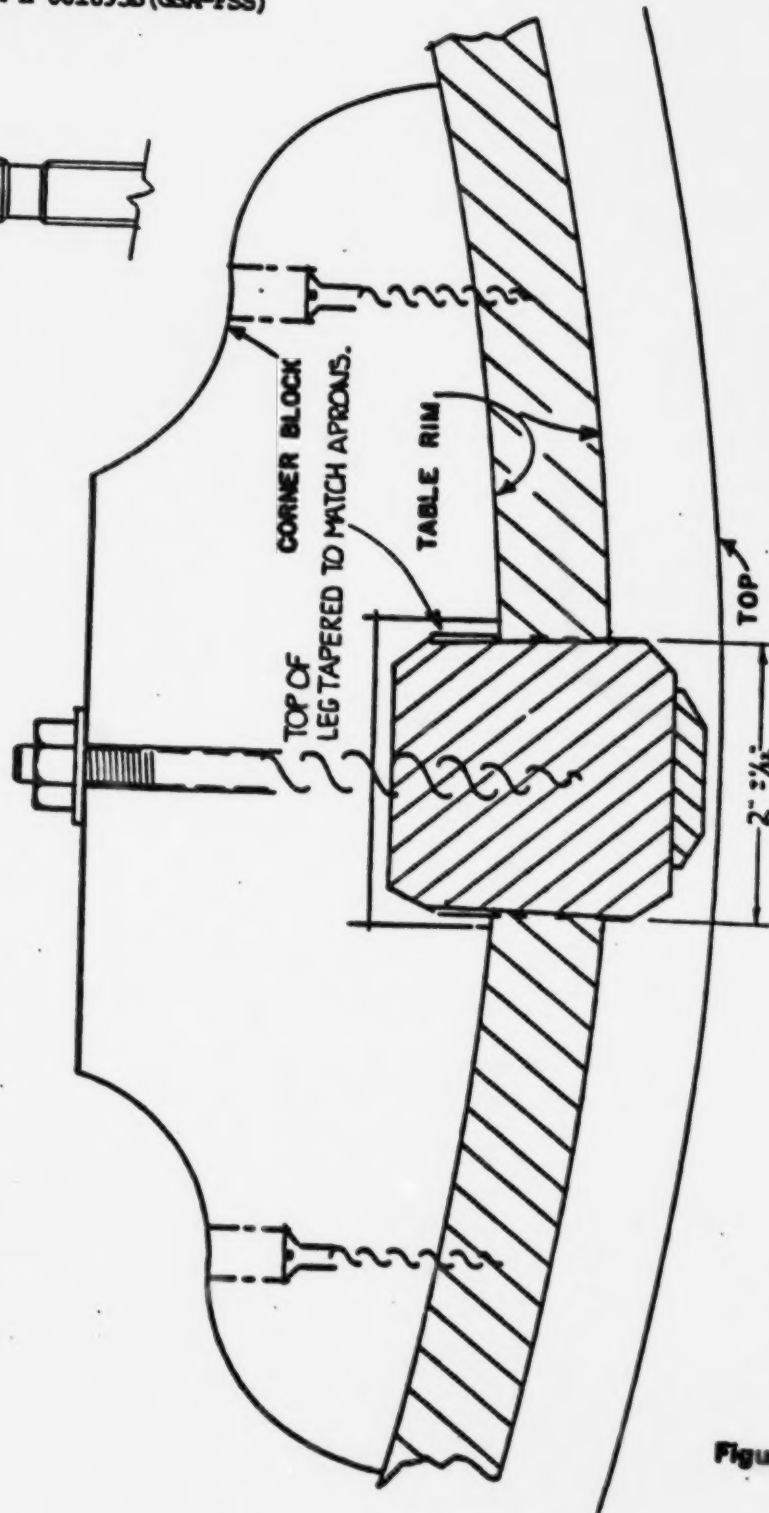
TYPICAL SECTIONS OF NIGHT STAND, BUFFET
AND SERVER

Figure 28A.

DINING TABLE LEG
LOCATION OF HANGER BOLT

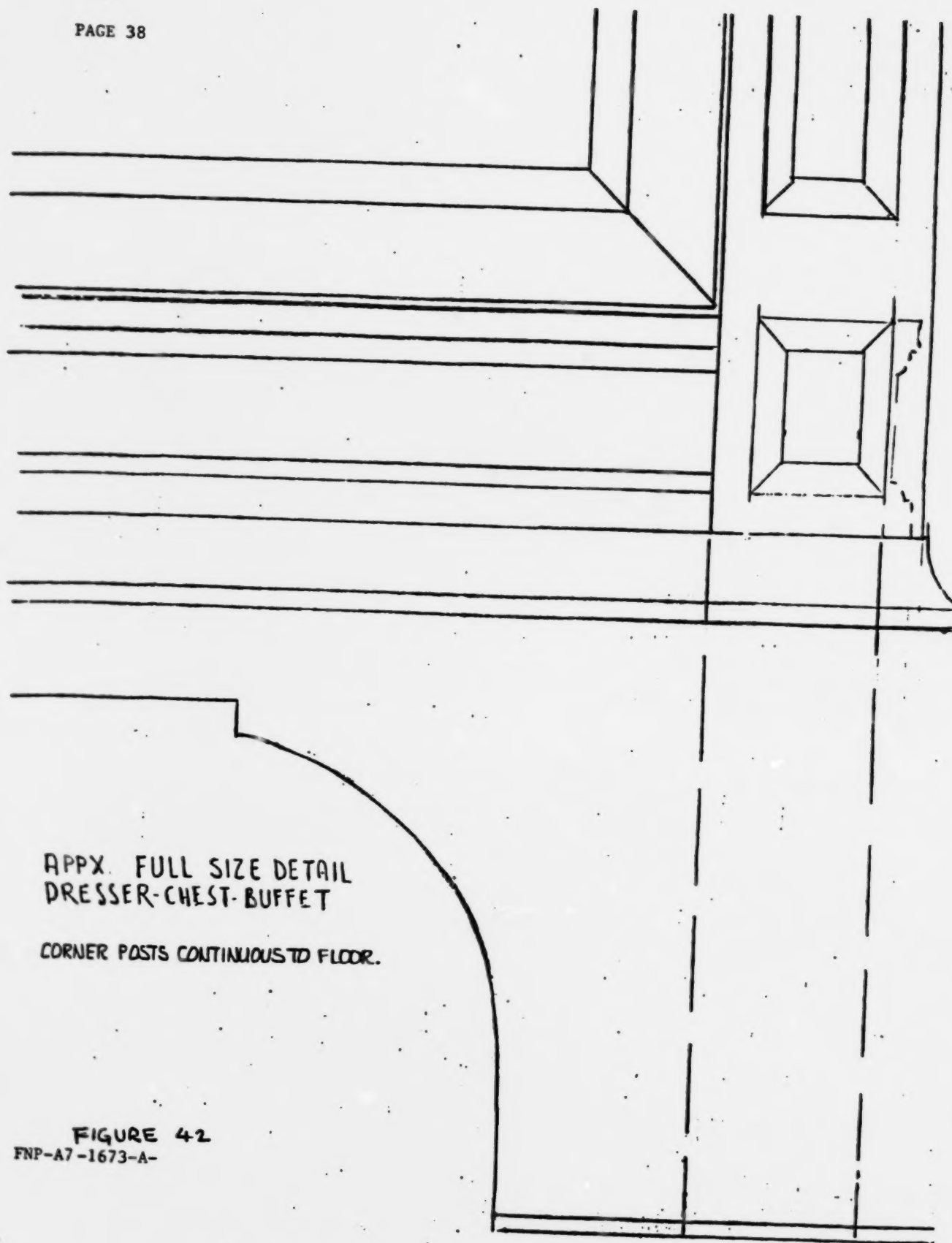
AA-B-001895B (GSA-FSS)

DIMENSIONS ARE CRITICAL BECAUSE DINING TABLE
LEGS MUST BE INTERCHANGABLE BETWEEN
MANUFACTURERS.



SECTION OF DINING TABLE LEG
COFFEE TABLE SAME EXCEPT FOR SIZE AND SHAPE OF OVAL
NOT TO SCALE

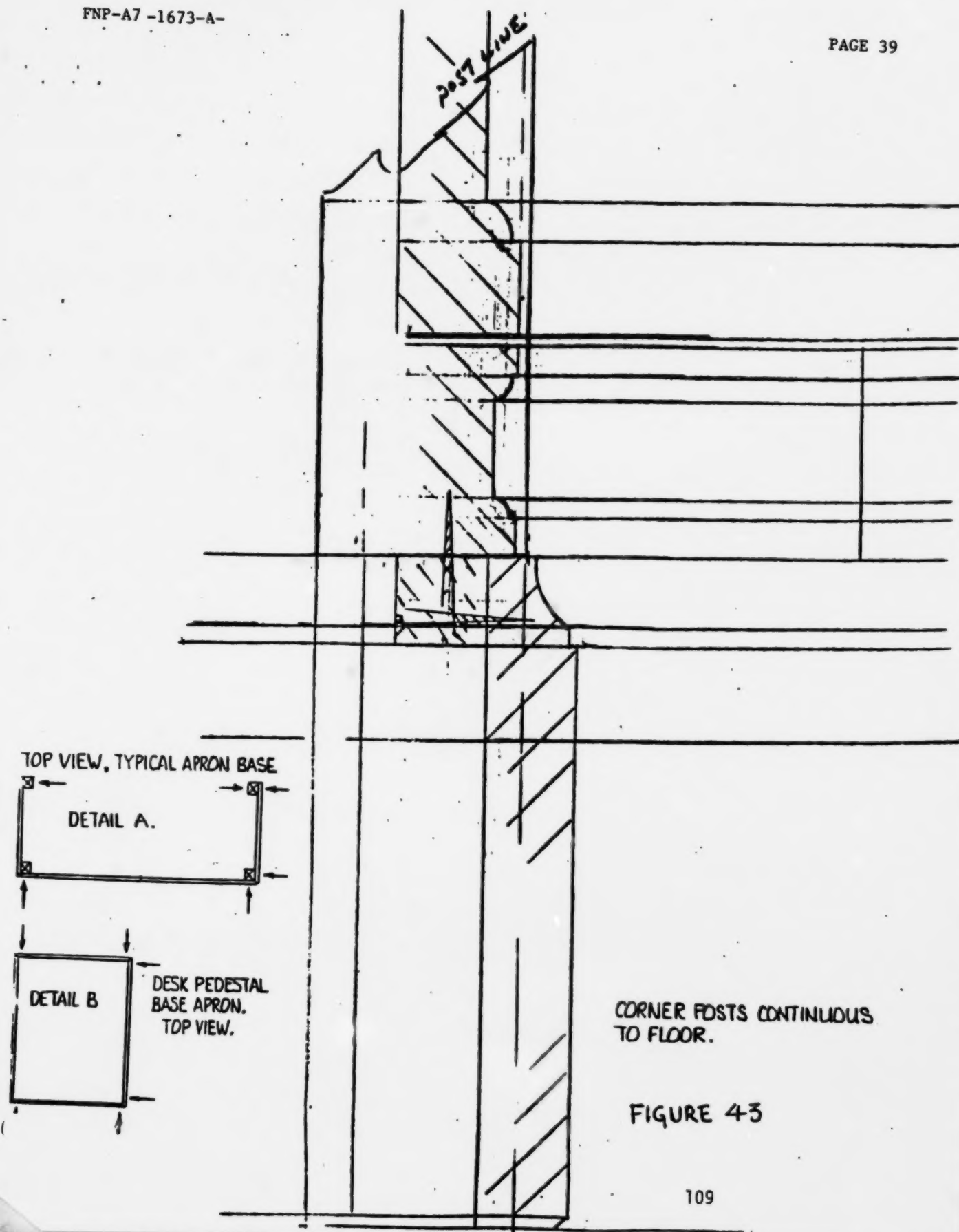
Figure 32 A.



APPX. FULL SIZE DETAIL
DRESSER-CHEST-BUFFET

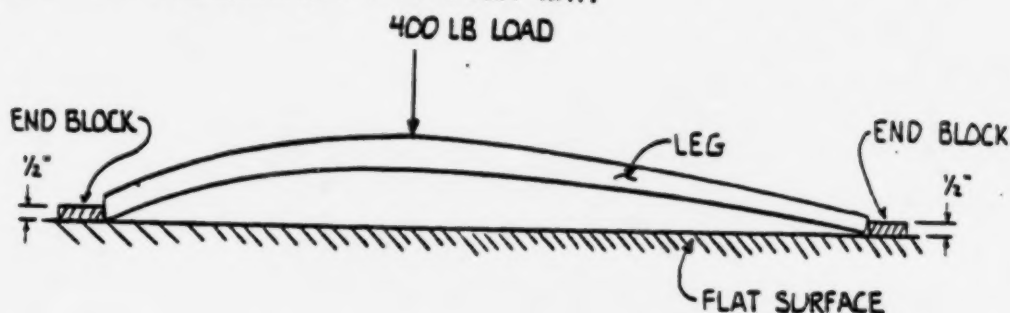
CORNER POSTS CONTINUOUS TO FLOOR.

FIGURE 42
FNP-A7-1673-A-



TO TEST LEGS:

1. PLACE EACH LEG ON A FLAT SURFACE.
2. TIGHTLY BLOCK EACH END AS SHOWN.
3. APPLY 400 LB LOAD AT HIGHEST POINT ON CROWN. AIR CYLINDER MAY BE USED PROVIDED IT IS PROPERLY CALIBRATED AND MONITORED DURING TESTING TO ENSURE LOAD ACCURACY.
4. MAINTAIN LOAD FOR 5 SECONDS AND RELEASE.
5. REJECT LEGS THAT CRACK, SPLIT, OR FAIL IN ANY WAY.



DINING CHAIR BACK LEG TEST

FIGURE 44

REQUIREMENTS TO BE INCORPORATED
INTO THE FURNITURE AND EPA RESEARCH PROGRAM PROCUREMENT

1. The offeror shall use as prescribed low polluting coating finishing systems on a **specified** quantity of furniture within this contract.
 - (a) Low polluting finishing systems shall be defined as those having a total volatile organic compound (VOC) emissions resulting in no greater than 100 lbs. of VOC per 1,000 square feet of finished surface. Waterborne coatings, two component catalyzed coatings, or other low solvent coatings shall be used to the maximum extent possible in order to meet this requirement. The finish of the wood shall be satin and shall match plastic laminate walnut tone on mahogany (FSS-L-01006) for color unless otherwise specified in the invitation to bid. A standard reference panel shall be provided with the bid to determine quality acceptability of the finish.
 - (b) The finishing system must comply with all performance requirements as defined in AA-H-001895B, January 1, 1980.
2. The offeror shall permit entrance into his manufacturing facility by EPA researchers or its representatives for the purpose of observing and documenting the furniture manufacturing process while using both low polluting and high solvent finishing systems.
 - (a) The maximum number of visits to the manufacturing facility will be four (4) with a maximum duration of one (1) week each.
 - (b) The government representatives shall be allowed access to those areas of the facility involved in the finishing process of the furniture involved in this procurement.
 - (c) If required, the offeror shall permit sampling and analysis of air, water, and solid waste streams from his facility for the purpose of assessing pollutant discharge reductions during manufacturing of the furniture involved in this procurement.
3. The offeror shall allow upon request, access to manufacturing employees to permit assessment of worker acceptance of low polluting finishing systems.
4. The offeror shall provide the following data to the EPA researchers:
 - (a) Percent repair and rework on the finishing line.
 - (b) Average man-hours expended for the low polluting finish system and average man-hour costs for normal finishing systems.Documented finishing procedures, furnished by the finishing material suppliers, covering pertinent data such as:
 - (a) Process parameters, including, line speeds, oven temperatures, power requirements and oven capacity.

- 2 -

- (b) Coating equipment transfer efficiency for the different types of coatings.
 - (c) Facility exhaust rates.
 - (d) Facility humidity during the evaluation period.
 - (e) Finish formulations indicating volatile organic compound content.
 - (f) Special instructions and cautions for using the low polluting finishing system.
5. All furniture finished under this program shall be indelibly marked in a conspicuous but accessible part of the furniture piece and shall identify the furniture as being coated with low solvent coatings and the date of the manufacture of the furniture.
6. Any variation in the requirement of Sections 1 thru 5 shall be permitted only with the written approval in writing of the procurement official (i.e. contracting officer).

B-FSS-100 (4/84)

DEFINITE QUANTITY CONTRACT FOR: FSC Class 7105 - Household and Quarters Furniture, Wood, Traditional Style.

C-FSS-FN-416A (4/84)

FINISH: Wood furniture shall match as closely as possible the overall color and gloss of GSA Standard Sample FSS-L-01006, walnut tone on mahogany plastic laminate. Within five (5) days of receipt of Notice of Contract Award, the successful bidder shall present to the contracting officer three (3) samples (5" X 7" minimum) of the finished wood to be utilized in production of items for the contract. The contracting officer shall approve the samples for color and gloss only.

C-FSS-FN-418A (4/84)

PLASTIC LAMINATES: Shall match as closely as possible the overall color and gloss of GSA Standard Sample FSS-L-01006, walnut tone on mahogany plastic laminate. Within five (5) days of receipt of Notice of Contract Award, the successful bidder shall present to the contracting officer three (3) samples (5" X 7" minimum) of the high pressure laminate to be utilized in production of items for the contract. The contracting officer will approve the samples for color and grain only.

C-FSS-449 (4/84)

ADDITIONAL REQUIREMENTS: In addition to the specifications cited in the item description(s), additional requirements which follow the Schedule of Items will apply as applicable.

C-FSS-FN-496 (4/84)

FABRIC: Shall match as closely as possible the overall GSA standard sample. Within five (5) days of receipt of Notice of Contract Award, the successful bidder shall present to the contracting officer three (3) samples (5" X 7" minimum) of the fabric to be utilized in production of items for the contract. The contracting officer will approve the samples for color and appearance only.

D-552.210-76 (4/84)

CHARGES FOR MARKING: In accordance with paragraph (b) of Clause 552.210-75, Marking, the Government will charge the contractor for marking or remarking improperly marked supplies at the rate of \$16.00 per man-hour for the first or fractional hour and \$10.00 for any succeeding or fractional hour.

D-FSS-FN-456 (4/84)

PACKAGING AND PACKING:

- (a) Each item shall be packaged and packed in a close fitting corrugated fiberboard box conforming to PPP-B-636, class weather resistant, grade V15C, and the closure, waterproof sealing, and reinforcing of the box shall comply with the appendix to PPP-B-636.
- (b) Interior blocking and bracing, as required by the applicable "F" package in accordance with the National Motor Freight Classification and Uniform Freight Classification, shall be utilized within the box to prevent movement and to provide the necessary clearance and protection during shipment, handling, storage, and redistribution.
- (c) Mirrors shall be packaged and packed as stated above, including cushioning material or fiberboard pads as necessary to prevent abrasion or breakage during shipment, handling, storage, and redistribution.
- (d) Chairs may be packaged and packed two to a box providing that the packaging includes blocking and bracing in accordance with the applicable "F" package of the National Motor Freight Classification and the Uniform Freight Classification.
- (e) The shipping containers shall be palletized on expendable wooden pallets, 2- or 4-way design, to facilitate handling in accordance with normal commercial practice. The palletized load shall not exceed 2,500 pounds in weight and 63 inches in height. Less than half palletized loads need not be palletized.
- (f) Mirrors shall not be palletized.

D-FSS-FN-457 (1/83)

SPECIAL DIRECT DELIVERY REQUIREMENT: Contractors are required to enclose with each shipment either a duplicate (facsimile) of the resultant purchase/delivery order or include the following information on their normal packaging invoice: consignee address, GSA contract number, requisition number, purchase order number, quantity ordered, and the quantity shipped.

D-FSS-FN-470A (12/81)

MARKING: Marking shall be in accordance with Article 9 of GSA Form 3507 (4/84) with the following exceptions:

1. Each package shall include all precautionary marking required by the National Motor Freight Classification and Uniform Freight Classification.
2. Mirrors shall be marked as stated above, including "UP" arrows indicating the position in which the packages shall be shipped and stored.

D-FSS-475 (4/84)

BAR CODE MARKING OF NATIONAL STOCK NUMBER (NSN): Bar Code Marking of the National Stock Number only is required in accordance with Federal Standard 123D, Change Notice 4, dated July 20, 1982.

A guide to bar code marking requirements for unit of issue containers (unit pack), intermediate, and shipping containers is as follows.

- (a) The preferred code density is "standard", but densities from "standard" to "low" shall be acceptable.
- (b) The contractor must guarantee the machine readability of bar code marking.
- (c) The Optical Character Recognition - font A (OCR-A) characters do not have to be machine readable.
- (d) In general, bar codes stenciled or multilithed by present methods cannot be read by bar code scanners.
- (e) Unless otherwise specified, the bar code height shall be a minimum of 0.25 inch, or 15 percent of the bar code length, whichever is greater.

Shipping containers with two or more stock numbered items inside, called "Multipacks" by the DOD, do not require bar code labels on either interior or exterior containers.

On intermediate and unit packs, the NSN in bar code with OCR-A below may be in the same label as the other data required by Federal Standard 123. In this case, the bar code NSN will appear on the top line with the OCR-A characters on the second line.

E-552.246-73 (4/84)

SOURCE INSPECTION:(a) Inspection by Government personnel.

(1) Supplies to be furnished under this contract ordinarily will be inspected at source by the Government prior to shipment from the manufacturing plant or other facility designated by the contractor, unless (a) the contractor is notified otherwise in writing by the contracting officer or his designated representative or (b) the contractor or his subcontractor, pursuant to a Quality Approved Manufacturer Agreement with the General Services Administration, is authorized to issue a certificate covering such supplies at the time of shipment notwithstanding the foregoing, the Government may perform any or all tests contained in the contract specifications at a Government facility without prior written notice by the contracting officer before release of the supplies for shipment.

(2) Inspection responsibility will be assigned to the Office of Contract Management of the GSA regional office having jurisdiction over the State in which the contractor's or subcontractor's plant or other designated point for source inspection is located. The contractor shall notify, or arrange for his subcontractor to notify, that office at least 10 days prior to the date when supplies will be ready for inspection. Shipments shall not be made until released by the Office of Contract Management unless release is otherwise authorized under terms of a currently applicable Quality Approved Manufacturer Agreement.

(b) Inspection and receiving reports. The contractor shall be responsible for preparation and distribution of inspection documents as follows: (1) DD Form 250, Material Inspection and Receiving Report, for deliveries to military agencies; or (2) GSA Form 308, Notice of Inspection, for deliveries to GSA or other civilian agencies. When required, the contractor will be furnished a supply of GSA Form 308, and/or DD Form 250, and complete instructions for the preparation and distribution.

(c) Availability of records. In addition to any other requirement of the contract, the contractor shall maintain at the point for source inspection, and make available to the contracting officer or an authorized representative, for the duration of the contract and six months (180 days) thereafter, records showing the following information for each order received under the contract: (1) order number; (2) date order received by the contractor; (3) quantity ordered; (4) date scheduled into production; (5) batch or lot number, if applicable; (6) date inspected and/or tested; (7) date available for shipment; and (8) date shipped or date service completed.

(d) Additional costs of inspection and testing. The contractor will be charged for any additional costs of inspecting/testing or reinspecting/retesting supplies for the reasons stated in paragraph (e) of Clause 52.246-2, Inspection of Supplies — Fixed-Price. In addition, if supplies purchased on an f.o.b. destination basis where source-inspected by Government personnel, but the supplies are not delivered or are delivered in a condition requiring Government reinspection of the same or replacement material, the contractor will be charged for the cost of such reinspection. Charges for inspection or testing shall be as specified elsewhere in the contract.

E-552.246-74 (4/84)

CHARGES FOR INSPECTION AND TESTING: As provided in the clauses in this contract relating to inspection, the contractor will be charged for any additional cost to the Government for inspection and testing (or reinspection and retesting). When such inspection or testing is performed by or under the direction of the General Services Administration, charges will be at the rate of \$11.00 per man-hour or fraction thereof if the inspection is at a GSA supply distribution; \$16.00 per man-hour or fraction thereof, plus travel costs incurred, if the inspection is at any other location; and \$16.00 per man-hour or fraction thereof for laboratory testing, except that when a testing facility other than a GSA laboratory performs all or part of the required tests, the contractor shall be assessed the actual cost incurred by the Government as a result of testing at such facility. When inspection is performed by or under the direction of any agency other than GSA, the charges indicated above may be used, or the agency may assess the actual cost of performing the inspection and testing.

E-FSS-500C (4/84)

PREPRODUCTION SAMPLES: The Contractor shall have available at his expense, within 30 calendar days after receipt of notice of award one preproduction sample of each item to be delivered under the contract for inspection and determination by the Government as to compliance with the specifications. Notwithstanding the foregoing requirement for a sample of each item, if this solicitation permits the submission of "Representative Preproduction Samples", such provision shall apply with respect to the items identified therein. Representative preproduction samples shall be subject to all of the provisions of this clause and any determination the Government makes regarding them shall apply equally to the items they represent.

All preproduction samples presented for inspection shall be completely packaged, packed, and marked ready for shipment. Any additional preproduction sample requirements (such as the submission of component parts, cut-aways showing upholstery methods, etc.) which may be set forth in the specifications applicable to this procurement are incorporated by reference, except that when identical component parts are common to different items, duplicate components need not be presented for inspection.

The Contractor shall notify the Procuring Contracting Officer (PCO) or, if delegated, the Administrative Contracting Officer (ACO), and the Regional Contract Management Division set forth in the notice of award, in writing, of the availability of the sample(s) for inspection, the notification to be made 10 calendar days prior to the date the Contractor proposes to have the sample(s) available. The Contractor shall without any additional charge provide all necessary facilities for inspection of the sample(s).

The preproduction sample(s) required by this contract must conform to all specification requirements. The acceptance of any previous preproduction sample(s) or the granting of any deviations on previous preproduction sample(s) or on supplies required by previous contracts for the same item(s) shall in no way be considered as justification for assuming that the preproduction sample(s) submitted under this contract will be accepted unless they fully meet specifications or that deviations will be granted.

When the preproduction sample(s) is approved, the Government shall notify the contractor of its acceptance in writing. After acceptance, the preproduction sample(s) shall be retained by the Contractor and made available to the Government without additional cost to the Government, at the location where the material is offered to the Government for inspection, until completion of the contract, at which time it may be delivered in "like new" condition as part of the last scheduled delivery under this contract.

If the contractor fails to deliver the preproduction sample(s) or if the Government disapproves the preproduction sample(s), the contractor shall be deemed to have failed to make delivery within the meaning of the "Default" clause of this contract and this contract shall be subject to termination for default provided that failure of the Government in such an event to terminate this contract for default shall not relieve the contractor of his responsibility to meet the delivery schedule for production quantities.

The Government reserves the right to waive the requirements for preproduction sample(s) as to those offerors offering a product which has been previously procured and approved by General Services Administration under the same specifications applicable to this procurement.

E-FSS-502A (4/84)

PREPRODUCTION SAMPLE REQUIREMENTS: One completely finished article is required for each item offered. Also, component parts of each item not common to each other must be offered as a part of the preproduction sample inspection. When preproduction samples involve upholstery fabrics, the contractor will be required to furnish 1 square yard of the specific fabric. All packaging and packing materials required for shipment are also required to be submitted in the preproduction sample inspection.

E-FSS-514 (4/84)

PRODUCTION AND INSPECTION POINT(S):

(a) Production Point. Offeror shall insert, in the appropriate spaces provided below, the names of the manufacturers of the items offered and the address, telephone number and DUNS number of the facility(ies) at which the items will be manufactured or produced.

(b) Source Inspection Point. Clause GSAR 552.246-73, Source Inspection, applies to all items in this solicitation. Offeror shall indicate in the spaces provided below the location(s) at which the supplies will be available for inspection. If the addresses of the respective production and inspection points are identical, offeror should insert "same" in the inspection point column.

(c) If additional space is needed, offeror shall furnish the requested information by an attachment to his offer.

<u>Item No(s).</u>	<u>Name of Manufacturer</u>	Production Point-Name Address (including county), Tel. No., Duns No.		<u>Inspection Point</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

E-FSS-539 (5/84)

QUALITY APPROVED MANUFACTURER AGREEMENT: Under the terms of this Quality Approved Manufacturer Agreement (QAMA), a quality control system shall be maintained which complies with all requirements of Federal Standard 368, edition in effect on the date the solicitation was issued. A written description of this system shall be made available to the Government prior to award. This system must be kept in effect throughout the contract period. Any changes in this system during the contract period shall be reported to the cognizant quality assurance office.

The contractor will be responsible for the performance of all testing and inspection required by the contract prior to release of awarded items for shipment.

Responsibility for inspection of each shipment shall rest with _____, NAME

_____ ; or _____, NAME

_____, alternate.
TITLE

When shipments are released, one of the officials named above shall sign a Quality Approved Manufacturer Certificate, certifying that material has been inspected and found to comply with requirements of the contract. The format for the certificate containing required information to be reported will be furnished upon award.

The contractor will be responsible for distribution of the certificate on the date of shipment as follows:
Copy 1 - contractor; Copy 2 - paying office; Copy 3 - mail to consignee; Copy 4 - attach to shipment enclosed in a waterproof packing list envelope and attach to Bill of Lading or other shipping document to be presented to

consignee upon delivery; Copy 5 - regional Contract Management Division of the quality assurance activity servicing your contract; Copy 6 - issuer of order; Extra - any additional copies specified in contract or purchase order. When DD Form 250, Material Inspection and Receiving Report, is required by the contract and/or order, the certificate shall be placed in Block 16 on this form and distributed as above.

In accordance with Article 44 of GSA Form 3507, Inspection Facilities, offerors will be required to specify the name and address of each manufacturing plant or other facility where supplies will be available for inspection, indicating the item numbers to which each applies. Although the Government will normally rely upon the contractor's certification as to the quality of items shipped, it reserves the right to inspect prior to acceptance at all times and places including the point of manufacture. When the Government advises the contractor of its intent to inspect supplies prior to shipment, the contractor shall notify or arrange for his subcontractor to notify the cognizant regional quality assurance activity at least 7 work days prior to the date when supplies will be ready for inspection. Shipment of this material shall not be made until after inspection by the Government is completed.

During the contract period, a Government representative will periodically select samples of material produced under the contract for Government verification inspection and testing.

Notwithstanding any other provision of this contract concerning the conclusiveness of acceptance by the Government, any supplies or production lots shipped under this contract found to be defective in material or workmanship, or otherwise not in conformity with the requirements of the contract within a period 12 months after acceptance shall, at the Government's option, be replaced, repaired, or otherwise corrected by the contractor at no cost to the Government within 30 calendar days (or such longer period as the Government may authorize in writing) after receipt of notice to replace or correct.

Inability to comply with delivery requirements on any order should be reported to the cognizant ACO, prior to the due date.

Notification of Quality Deficiency

If material in process, shipped, or awaiting shipment to fill Government orders, is found not to comply with contract requirements, or if deficiencies in either plant quality or process controls are found, the contractor may be issued a Notification of Quality Deficiency. Upon receipt of a Notification of Quality Deficiency, the contractor shall take immediate corrective action and should suspend shipment of the items covered by the NQD until such time as corrective action has been completed. The contractor, within 5 work days, shall notify the cognizant quality assurance office of corrective action taken or to be taken to permit onsite verification by a Government representative. Shipment of nonconforming material will be returned at contractor's expense and may cause this contract to be terminated. Delays due to the need for corrective action pursuant to this section will not constitute excusable delays under the Default Clause. Failure to complete corrective action in a timely manner may result in termination of this contract.

This contract may be terminated for default if subsequent Government inspection discloses that plant quality and progress controls are not being maintained, sub-specification material is being shipped, or for failure to comply with any provisions required by the QAMA.

Quality Approved Manufacturer Agreement Certification

The offeror agrees to and certifies compliance with all of the provisions of the agreement listed above. The provisions are mandatory and are applicable to the offeror and to any of his subcontractors designated as inspection points for contracts under this solicitation.

F-FSS-FN-260 (4/84)

TIME OF DELIVERY: The Government requires that delivery be made in accordance with the following delivery schedule. Deliveries must be made once a month within a given month.

	<u>MAR</u> <u>1985</u>	<u>APR</u> <u>1985</u>	<u>MAY</u> <u>1985</u>	<u>JUN</u> <u>1985</u>	<u>JUL</u> <u>1985</u>	<u>AUG</u> <u>1985</u>	<u>Total</u>
<u>Bedroom</u>							
Headboard, Sgl.	1,014	1,014	1,014	1,014	1,015	1,015	6,086
Headboard, Dbl.	915	915	916	916	916	916	5,494
Dresser, Sgl.		392		500		500	1,392
Dresser, Dbl.	580	740	986	890	1,000	1,020	5,216
Chest, 3 Drw.					200		200
Chest, 6 Drw.	1,164	1,164	1,164	1,164	1,164	1,165	6,985
Night Stand	1,997	1,997	1,998	1,998	1,998	1,998	11,986
Mirror, 26 X 36				1,567			1,567
Mirror, 30 X 44		1,214	1,214		1,215	1,215	4,858
<u>Dining Room</u>							
Hutch	790	790	790	791	791	791	4,743
Buffet	701	701	701	1,000	701	702	4,506
Server		550	550	550	550	522	2,722
Table, Oval	940	940	940	940	940	963	5,663
<u>Chairs</u>							
Chair, w/o Arms	4,128	4,128	4,128	4,129	4,129	4,129	24,771
Chair, w/Arms			1,153		1,154		2,307
<u>Miscellaneous</u>							
Coffee Table		1,550	1,550	1,550	1,550		6,200
Lamp Table						250	250
End Table	1,450	1,450	1,450	1,450	1,450	1,488	8,738
Pivot Top Table			1,081				1,081
<u>Desk & Bookcase</u>							
Desk	763	763	763	763	764	764	4,580
Bookcase	838	838	838	838	838	839	5,029

F-FSS-215 (4/84)

DELIVERY - F.O.B. INLAND CARRIER, POINT OF EXPORTATION: Offers shall be submitted f.o.b. inland carrier, point of exportation (FAR 52.247-38), for delivery to any one or more of the ports of exportation listed in Clause No. M-FSS-235 of this solicitation. The offeror shall specify, in the spaces provided in the item listing, the appropriate port (or ports) of exportation to which his offer applies.

F-FSS-FN-362 (4/84)

PREDETERMINED CUBIC MEASUREMENTS: For the purpose of evaluating bids and for no other purpose, the cubic measurements per shipping container for each item (National Stock Number) as set forth below will be applied by the Government in determining ocean transportation and related costs.

<u>National Stock Number</u>	<u>Cube Per Shipping Container</u>
7105-00-449-2990	13.5 cu. ft.
7105-00-455-6954	18.1 cu. ft.
7105-00-455-6926	18 cu. ft.
7105-00-449-2793	5.4 cu. ft.
7105-00-449-2804	6.8 cu. ft.
7105-00-449-2839	6.6 cu. ft.
7105-00-455-6935	26.7 cu. ft.
7105-00-455-6936	3.3 cu. ft.
7105-00-455-6906	21.6 cu. ft.
7105-00-455-6911	27.5 cu. ft.
7105-00-449-2937	27.5 cu. ft.
7105-00-080-6158	32.9 cu. ft.
7105-00-449-2980	15.7 cu. ft.
7105-00-449-2947	18.6 cu. ft.
7105-00-455-6974	9.7 cu. ft.
7105-00-455-6958	4.8 cu. ft.
7105-00-449-3044	14.1 cu. ft.
7105-00-449-3050	4.4 cu. ft.
7105-00-449-3091	27.3 cu. ft.
7105-00-449-3078	15 cu. ft.
7105-00-449-2885	1.8 cu. ft.

The contractor shall state actual cubic measurements when shipping data must be specified on export movement documents required to be furnished under this contract.

F-FSS-736A (4/84)

EXPORT TRAFFIC RELEASE: Supplies for export will not be shipped by the Contractor until shipping instructions are received from GSA. To obtain shipping instructions, the contractor shall forward completed copies of GSA Form 1611, "Application for Shipping Instructions and Notice of Availability", to the GSA office designated on the purchase order at least fifteen (15) days prior to the anticipated shipping date. Copies of GSA Form 1611 will be furnished to the Contractor with the purchase order. Failure to comply with this requirement could result in nonacceptance of the material by authorities at the port of exportation.

F-FSS-742A (4/84)

NOTICE OF SHIPMENT: In addition to the notice of shipment which may be required pursuant to Article 12 of GSA Form 3507, the contractor shall, at the time each shipment is made under this contract, furnish a notice of shipment to the Administrative Contracting Officer, Attention: (See SF 33, Block 24). This requirement may be satisfied by furnishing documents similar to those referred to Article 12 of GSA Form 3507.

H-FSS-FN-59 - LOW POLLUTING FINISH REQUIREMENTS

The successful contractor for Group II - Dining Room - will be required to provide 1,000 buffets in a low polluting finish (see pages 41 and 42 for technical requirements). Requisition Nos. WK4E4N-4023-0016 and WK4E4N-4130-0010 will be utilized for this requirement. The remaining quantity of buffets will be provided with the finish IAW AA-H-001895B (GSA-FSS).

The bid price for Item 11(b) - Buffet - in a Low Polluting Finish - shall not exceed 10% of the bid price for buffets made IAW AA-H-001895B (FSA-FSS).

G-FSS-900A (4/84)

CONTACT FOR CONTRACT ADMINISTRATION: Offerors are requested to designate a person to be contacted for prompt contract administration.

NAME _____ TITLE _____

ADDRESS _____ ZIP CODE _____

AREA CODE _____ TELEPHONE NO. _____ TELEX NO. _____ TWX _____

G-FSS-905B (4/84)

PLACEMENT OF ORDERS: Orders will be placed by GSA, FSS, FNI.

G-FSS-913B (4/84)

CONTRACTOR'S PAYMENT ADDRESS: The offeror shall indicate the address to which Government checks should be mailed for payment of invoices submitted under any resultant contract.

Please note that all purchase orders placed against a Federal Supply Schedule contract are to be paid by the individual agency placing the order. Each purchase order will cite the appropriate payment address, and invoices should be mailed to that address. Invoices should be sent to GSA only for orders placed by GSA. Any other invoices sent to GSA will only delay your receiving payment.

I-52.214-26 (4/84)

AUDIT - FORMAL ADVERTISING:

(a) Cost or pricing data. If the contractor has submitted cost or pricing data in connection with the pricing of any modification to this contract, unless the pricing was based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation, the contracting officer or a representative who is an employee of the Government shall have the right to examine and audit all books, records, documents, and other data of the contractor (including computations and projections) related to negotiating, pricing, or performing the modification, in order to evaluate the accuracy, completeness, and currency of the cost or pricing data. In the case of pricing any modification, the Comptroller General of the United States or a representative who is an employee of the Government shall have the same rights.

(b) Availability. The contractor shall make available at its office at all reasonable times the materials described in paragraph (a) above, for examination, audit, or reproduction, until 3 years after final payment under this contract, or for any other period specified in Subpart 4.7 of the Federal Acquisition Regulation (FAR). FAR Subpart 4.7, Contractor Records Retention, in effect on the date of this contract, is incorporated by reference in its entirety and made a part of this contract.

(1) If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for 3 years after any resulting final termination settlement.

(2) Records pertaining to appeals under the Disputes clause or to litigation or the settlement of claims arising under or relating to the performance of this contract shall be made available until disposition of such appeals, litigation, or claims.

(c) The contractor shall insert a clause containing all the provisions of this clause, including this paragraph (c), in all subcontracts over \$10,000 under this contract, altering the clause only as necessary to identify properly the contracting parties and the contracting office under the Government prime contract.

I-52.214-27 (4/84)

PRICE REDUCTION FOR DEFECTIVE COST OR PRICING DATA—MODIFICATIONS—FORMAL ADVERTISING:

(a) This clause shall become operative only for any modification to this contract involving aggregate increases and/or decreases in costs, plus applicable profits, of more than \$500,000 except that this clause does not apply to any modification for which the price is -

- (1) Based on adequate price competition;
- (2) Based on established catalog or market prices of commercial items sold in substantial quantities to the general public; or
- (3) Set by law or regulation.

(b) If any price, including profit, negotiated in connection with any modification under this clause, was increased by any significant amount because (1) the contractor or a subcontractor furnished cost or pricing data that were not complete, accurate, and current as certified in its Certificate of Current Cost or Pricing Data, (2) a subcontractor or prospective subcontractor furnished the contractor cost or pricing data that were not complete, accurate, and current as certified in the Contractor's Certificate of Current Cost or Pricing Data, or (3) any of these parties furnished data of any description that were not accurate, the price shall be reduced accordingly and the contract shall be modified to reflect the reduction. This right to a price reduction is limited to that resulting from defects in data relating to modifications for which this clause becomes operative under paragraph (a) above.

(c) Any reduction in the contract price under paragraph (b) above due to defective data from a prospective subcontractor that was not subsequently awarded the subcontract shall be limited to the amount, plus applicable overhead and profit markup, by which (1) the actual subcontract or (2) the actual cost to the contractor, if there was no subcontract, was less than the prospective subcontract cost estimate submitted by the contractor; provided, that the actual subcontract price was not itself affected by defective cost or pricing data.

I-52.214-28 (4/84)

SUBCONTRACTOR COST OR PRICING DATA—MODIFICATIONS - FORMAL ADVERTISING:

(a) The requirements of paragraphs (b) and (c) of this clause shall (1) become operative only for any modification to this contract involving aggregate increases and/or decreases in costs, plus applicable profits, expected to exceed \$500,000 and (2) be limited to such modifications.

(b) Before awarding any subcontract expected to exceed \$500,000 when entered into, or pricing any subcontract modification involving aggregate increases and/or decreases in costs, plus applicable profits, expected to exceed \$500,000, the contractor shall require the subcontractor to submit cost or pricing data (actually or by specific identification in writing), unless the price is -

- (1) Based on adequate price competition;
- (2) Based on established catalog or market prices of commercial items sold in substantial quantities to the general public; or
- (3) Set by law or regulation.

(c) The contractor shall require the subcontractor to certify in substantially the form prescribed in subsection 15.804-4 of the Federal Acquisition Regulation that, to the best of its knowledge and belief, the data submitted under paragraph (b) above were accurate, complete, and current as of the date of agreement on the negotiated price of the subcontract or subcontract modification.

(d) The contractor shall insert the substance of this clause, including this paragraph (d), in each subcontract that exceeds \$500,000 when entered into.

I-52.216-18 (4/84)

ORDERING:

(a) Any supplies and services to be furnished under this contract shall be ordered by issuance of delivery orders by the individuals or activities designated in the Schedule. Such orders may be issued from January 1, 1985 through December 31, 1985.

(b) All delivery orders are subject to the terms and conditions of this contract. In the event of conflict between a delivery order and this contract, the contract shall control.

(c) If mailed, a delivery order is considered "issued" when the Government deposits the order in the mail. Orders may be issued orally or by written telecommunications only if authorized in the Schedule.

I-52.216-20 (4/84)

DEFINITE QUANTITY:

(a) This is a definite-quantity, indefinite-delivery contract for the supplies or services specified, and effective for the period stated, in the Schedule.

(b) The Government shall order the quantity of supplies or services specified in the Schedule, and the Contractor shall furnish them when ordered. Delivery or performance shall be at locations designated in orders issued in accordance with the Ordering clause and the Schedule.

(c) Except for any limitations on quantities in the Delivery-Order Limitations clause or in the Schedule, there is no limit on the number of orders that may be issued. The Government may issue orders requiring delivery to multiple destinations or performance at multiple locations.

(d) Any order issued during the effective period of this contract and not completed within that time shall be completed by the Contractor within the time specified in the order. The contract shall govern the Contractor's and Government's rights and obligations with respect to that order to the same extent as if the order were completed during the contract's effective period; provided, that the Contractor shall not be required to make any deliveries under this contract after December 31, 1985.

I-52.220-1 (4/84)

PREFERENCE FOR LABOR SURPLUS AREA CONCERNS:

(a) This acquisition is not a set aside for labor surplus area (LSA) concerns. However, the offeror's status as such a concern may affect (1) entitlement to award in case of tie offers or (2) offer evaluation in accordance with the Buy American Act clause of this solicitation. In order to determine whether the offeror is entitled to a preference under (1) or (2) above, the offeror must identify, below, the LSA in which the costs to be incurred on account of manufacturing or production (by the offeror or the first-tier subcontractors) amount to more than 50 percent of the contract price.

(b) Failure to identify the locations as specified above will preclude consideration of the offeror as an LSA concern. If the offeror is awarded a contract as an LSA concern and would not have otherwise qualified for award, the offeror shall perform the contract or cause the contract to be performed in accordance with the obligations of an LSA concern.

I-552.222-28 (4/84)

EQUAL OPPORTUNITY PREAWARD CLEARANCE OF SUBCONTRACTS: Notwithstanding the clause of this contract entitled "Subcontractors", the contractor shall not enter into a first-tier subcontract for an estimated or actual amount of \$1 million or more without obtaining in writing from the contracting officer a clearance that the proposed subcontractor is in compliance with equal opportunity requirements and therefore is eligible for award.

I-552.203-70 ALT I (4/84)

ADVERTISING OF AWARD: The contractor agrees not to refer to awards in commercial advertising in such a manner as to state or imply that the product or service provided is endorsed or preferred by the Federal Government or is considered by the Government to be superior to other products or services.

I-552.232-72 (4/84)

INVOICE REQUIREMENTS: The original invoice shall be submitted to the Government office designated in this contract or on the delivery order to receive invoices. To constitute a proper invoice, the invoice must include the following information and/or attached documentation:

- (1) Name of the business concern and invoice date.
- (2) Contract number, or other authorization for delivery of property or services.
- (3) Description, price, and quantity of property and services actually delivered or rendered.
- (4) Shipping and payment terms.
- (5) Name (where practicable), title, phone number, and complete mailing address of responsible official to whom payment is to be sent. The "remit to" address must correspond to the remittance address in the contract.
- (6) Other substantiating documentation or information as required by the contract.

I-552.232-73 (4/84)

METHOD OF PAYMENT:

(a) Payments under this contract will be made either by check or by wire transfer through the Treasury Financial Communications System at the option of the Government.

(b) The contractor shall forward the following information in writing to GSA, Accounts Payable Branch, P.O. Box 1901, Kansas City, Missouri 64141, not later than 7 days after receipt of notice of award.

(1) Full name (where practicable), title, phone number, and complete mailing address of responsible official(s) (i) to whom check payments are to be sent, and (ii) who may be contacted concerning the bank account information requested below.

(2) The following bank account information required to accomplish wire transfers:

- (i) Name, address, and telegraphic abbreviation of the receiving financial institution.

(ii) Receiving financial institution's 9-digit American Bankers Association (ABA) identifying number for routing transfer of funds. (Provide this number only if the receiving financial institution has access to the Federal Reserve Communication System.)

(iii) Recipient's name and account number at the receiving financial institution to be credited with the funds.

(iv) If the receiving financial institution does not have access to the Federal Reserve Communications System, provide the name of the correspondent financial institution through which the receiving financial institution receives electronic funds transfer messages. If a correspondent financial institution is specified, also provide:

(A) Address and telegraphic abbreviation of the correspondent financial institution.

(B) The correspondent financial institution's 9-digit ABA identifying number for routing transfer of funds.

(c) Any changes to the information furnished under paragraph (b) of this clause shall be furnished to the contracting officer in writing at least 30 days before the effective date of the change. It is the contractor's responsibility to furnish these changes 30 days before submitting invoices to avoid invoices being returned as improper.

(d) The document furnishing the information required in paragraphs (b) and (c) must be dated and contain the signature, title, and telephone number of the contractor official authorized to provide it, as well as the contractor's name and contract number. OMB Control Number 3090-0141.

I-FSS-52A (4/84)

STANDARD INDUSTRIAL CLASSIFICATION AND SIZE STANDARD: The Standard Industrial Classification Code applicable to all items in this procurement is No. 2511, and the applicable Small Business Size Standard is 500 employees.

I-FSS-65 (4/84)

VALUE INCENTIVE CLAUSE: The Value Incentive Clause, GSA Form 2984, June 1976 edition, is incorporated as a part of contracts awarded under this solicitation. This clause provides an opportunity for Contractors to share in cost-savings benefits through the submission of acceptable cost-reduction ideas, but is not a contract requirement. A copy of GSA Form 2984 will be mailed with each contract awarded under this solicitation which exceeds \$25,000 in value.

I-FSS-160A (4/84)

OPTION TO INCREASE QUANTITIES:

(a) The Government reserves the right, at its option, to increase the quantity for each item (National Stock Number) awarded by not more than 25 percent, and the successful offeror agrees to accept such increase at the same unit prices as provided in the contract for the initial quantities. In the event an award is made to a supplier for the same item for delivery to two or more destinations, the increased quantity the Government may order is an amount equal to 25 percent of the total quantity of such item awarded the supplier. All or any part of the increased quantity may be directed to any destination shown in the contract for the item, at the price specified for such destination. In the event any part of the increased quantity is directed to a destination not shown in the contract for the item, the provisions of Clause 46 of GSA Form 3507, shall apply.

(b) The right to exercise this option shall not extend for a period of more than 90 days beyond the date of initial award. Delivery of any additional quantities ordered pursuant to this clause shall be made within the same number of days after receipt of notice of increase as provided for delivery of the initial contract quantities.

I-FSS-342 (4/84)

BUY AMERICAN ACT, GSA FORM 3507, ARTICLE 30: This Buy American Act clause is not applicable to contracts involving eligible products from designated countries when the award price for the product is \$161,000 or more.

I-FSS-FN-540 (12/81)

NOTIFICATION TO CONSIGNEES OF DEFECTS: Where the Government provides written notice to the Contractor that supplies furnished under the contract are defective in material or workmanship or otherwise not within the requirements of this contract, the contractor agrees, when directed by the Government, to provide written notice to all consignees which received such nonconforming supplies. This notice shall advise such consignees of whatever remedial or corrective action is to be taken as agreed to by the contracting officer and the contractor.

Whenever such a notice is issued, the contractor must provide a report to the contracting officer showing the consignees notified, the consignees who responded and the remedy chosen by each consignee.

Failure to agree upon any determination to be made under this provision shall be a dispute concerning a question of fact within the meaning of the "Disputes" clause of this contract.

I-FSS-540A (4/84)

WARRANTY OF SUPPLIES:

(a) Notwithstanding inspection and acceptance by the Government of supplies furnished under the contract or any provision of this contract concerning the conclusiveness thereof, the Contractor warrants that for a period of one year, dating from time of final inspection and acceptance at destination of, all supplies furnished under this contract will be free from defects in material or workmanship and will conform with the specifications and all other requirements of this contract. Further, the Contractor certifies that the supplies will be suitable for their intended purpose. Unless otherwise provided, this warranty period shall begin 60 days after date of shipment.

(b) Unless otherwise provided, this warranty is applicable both within and outside the continental limits of the United States.

(c) Within a reasonable time after discovery of any breach of this warranty, the contracting officer or other Government representative shall give written notice to the contractor which will require (i) the prompt correction or replacement of any supplies or part thereof (including preservation, packaging, packing, and marking) that do not conform with the requirements of this contract within the meaning of paragraph (a) of this clause, or (ii) retain such supplies, whereupon the contract price thereof shall be reduced by the contracting officer in an amount which is negotiated and agreed upon as being equitable under the circumstances and the contractor shall promptly make appropriate repayment.

(d) When correction or replacement is required, the Contracting Officer or other Government representative shall return the supplies or part thereof, where feasible, and transportation charges and responsibility for such supplies while in transit shall be borne by the contractor. However, the contractor's liability for such transportation charges shall not exceed an amount equal to the cost of transportation by the usual commercial method of shipment between the designated destination point under this contract and the contractor's plant and return.

(e) If the Contractor fails or refuses to correct or replace the nonconforming supplies within a period of ten (10) days (or such longer period as the Contracting Officer may authorize in writing) after receipt of notice from the contracting officer or other Government representative specifying such failure or refusal, the contracting officer may, by contract or otherwise, correct or replace them with similar supplies and charge to the Contractor the cost occasioned to the Government thereby. In addition, if the contractor fails to furnish timely disposition instructions, the contracting officer may dispose of the nonconforming supplies for the contractor's account in a reasonable manner, in which case the Government is entitled to reimbursement from the contractor or from the proceeds for the reasonable expenses of the care and disposition of the nonconforming supplies, as well as for excess costs incurred or to be incurred.

- (f) Any supplies or parts thereof corrected or furnished in replacement pursuant to this clause shall also be subject to all the provisions of this clause to the same extent as supplies initially delivered.
- (g) Failure to agree upon any determination to be made under this clause shall be a dispute concerning a question of fact within the meaning of the "Disputes" clause of this contract.
- (h) The word "supplies" as used herein includes related services.
- (i) The rights and remedies of the Government provided in this clause are in addition to and do not limit any rights afforded to the Government by any other clause of the contract.
- (j) In addition to other marking requirements of this contract, the container of all warranted items shall be clearly marked by the Contractor by affixing a cloth tag or durable label which must set forth the contract number and state: "This item is warranted for 14 months."

I-FSS-FN-542A (12/81)

WARRANTY IDENTIFICATION INFORMATION:

- (a) All required identification labels or marking on the items shall include the following in bold print:
"WARRANTED ITEM
IF DEFECTIVE CONTACT GSA"
- (b) Each item shall have a minimum 2-5/8" X 5-1/4" hang tag prominently attached, with the following in at least 1/2" bold print:
"WARRANTED ITEM
IF DEFECTIVE CONTACT GSA"

I-FSS-916A (4/84)

PAYMENT DUE DATE:

- (a) Payments under this contract will be due on the 30th calendar day after the later of:
 - (1) The date of actual receipt of a proper invoice in the office designated to receive the invoice, or
 - (2) The date the supplies are accepted by the Government.
- (b) For the purpose of determining the due date for payment and for no other purpose, acceptance will be deemed to occur on the 7th calendar day after the date of delivery of the supplies in accordance with the terms of the contract.
- (c) If the supplies are rejected for failure to conform to the technical requirements of the contract, or for damage in transit or otherwise, the provisions in paragraph (b) of this clause will apply to the new delivery of replacement supplies.
- (d) The date of the check issued in payment shall be considered to be the date payment is made.
- (e) The designated Government paying office for this contract/purchase order is: (As shown on purchase order.)
- (f) The vendor's remittance or check mailing address, if different from the business address is: _____

REPRESENTATIONS AND CERTIFICATIONS	Reference (Solicitation No.)
Name and Address of Offeror (No., Street, City, State, and Zip Code)	Date

"SOLICITATIONS" MEANS "INVITATION FOR BIDS" IN FORMAL ADVERTISING AND "REQUEST FOR PROPOSAL" OR "REQUEST FOR QUOTATION" IN NEGOTIATION.

"OFFER" MEANS "BID" IN FORMAL ADVERTISING AND "PROPOSAL" IN NEGOTIATION.

"OFFEROR" MEANS THE PERSON OR FIRM SUBMITTING THE OFFER.

THE OFFEROR MAKES THE FOLLOWING REPRESENTATIONS AND CERTIFICATIONS AS A PART OF THE OFFER IDENTIFIED ABOVE. (CHECK APPROPRIATE BOXES AND FILL IN BLANKS.)

1. 52.219-01 SMALL BUSINESS CONCERN REPRESENTATION (APR 1984)

The offeror represents and certifies as part of its offer that it ☐ is, ☐ is not a small business concern and that ☐ all, ☐ not all supplies to be furnished will be manufactured or produced by a small business concern in the United States, its possessions, or Puerto Rico. "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the size standards in this solicitation.

2. 52.225-01 BUY AMERICAN CERTIFICATE (APR 1984)

(Applicable to solicitations for supplies, or for services involving the furnishing of supplies, for use in the United States, except for acquisitions made under the Trade Agreements Act of 1979.)

The offeror certifies that each end product, except those listed below, is a domestic end product (as defined in the clause entitled "Buy American Act--Supplies"), and that components of unknown origin are considered to have been mined, produced, or manufactured outside the United States.

Excluded End Products	Country of Origin
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Offerors may obtain from the contracting officer lists of articles, materials, and supplies excepted from the Buy American Act (listed at 25.108 of the Federal Acquisition Regulation).

ITEMS 3, 4, 5 AND 6 NEED BE CHECKED ONLY IF OFFER EXCEEDS \$10,000 IN AMOUNT.

3. 52.222-19 WALSH-HEALY PUBLIC CONTRACTS ACT REPRESENTATION (APR 1984)

(Applicable to supply contracts unless exempted by the Secretary of Labor.)

The offeror represents as a part of this offer that the offeror is ☐ or is not ☐ a regular dealer in, or is ☐ or is not ☐ a manufacturer of, the supplies offered.

4. 52.222-22 PREVIOUS CONTRACTS AND COMPLIANCE REPORTS (APR 1984)

The offeror represents that —

(a) It ☐ has, ☐ has not participated in a previous contract or subcontract subject either to the Equal Opportunity clause of this solicitation, the clause originally contained in Section 310 of Executive Order No. 12923, or the clause contained in Section 201 of Executive Order No. 11114;

(b) It ☐ has, ☐ has not, filed all required compliance reports; and

(c) Representations indicating submission of required compliance reports, signed by proposed subcontractors, will be obtained before subcontract awards.

5. 52.222-23 AFFIRMATIVE ACTION COMPLIANCE (APR 1984)

(Applicable to other than construction contracts which include the clause at FAR 52.222-26, Equal Opportunity.)

The offeror represents that —

(a) It ☐ has developed and has on file, ☐ has not developed and does not have on file, as each establishment, affirmative action programs required by the rules and regulations of the Secretary of Labor (41 CFR 60-1 and 60-2), or

(b) It ☐ has not previously had contracts subject to the written affirmative action programs requirement of the rules and regulations of the Secretary of Labor.

6. 52.222-21 CERTIFICATION OF NONSEGREGATED FACILITIES (APR 1984)

(a) "Segregated facilities," as used in this provision, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise.

(b) By the submission of this offer, the offeror certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The offeror agrees that a breach of this certification is a violation of the Equal Opportunity clause in the contract.

(c) The offeror further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) it will—

- (1) Obtain identical certifications from proposed subcontractors before the award of subcontracts under which the subcontractor will be subject to the Equal Opportunity clause;
- (2) Retain the certifications in the files; and
- (3) Forward the following notice to the proposed subcontractors (except if the proposed subcontractors have submitted identical certifications for specific time periods).

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS
OF NONSEGREGATED FACILITIES.**

A Certification of Nonsegregated Facilities must be submitted before the award of a subcontract under which the subcontractor will be subject to the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semi-annually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

THE FOLLOWING ITEMS 7-16 DO NOT APPLY TO PROCUREMENTS IN THE AMOUNT OF \$25,000 OR LESS MADE THROUGH SMALL PURCHASE PROCEDURES.

7. 52.219-01 WOMEN-OWNED SMALL BUSINESS REPRESENTATION (APR 1984)

(a) Representation. The offeror represents that it ☐ is, ☐ is not a women-owned small business concern.

(b) Definitions. "Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominate in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria and size standards in 13 CFR 121.

"Women-owned," as used in this provision, means a small business that is at least 51 percent owned by a woman or women who are U.S. citizens and who also control and operate the business.

8. 52.219-02 SMALL DISADVANTAGED BUSINESS CONCERN REPRESENTATION (APR 1984)

(a) Representation. The offeror represents that it ☐ is, ☐ is not a small disadvantaged business concern.

(b) Definitions. "Asian-Indian American," as used in this provision, means a United States citizen whose origins are in India, Pakistan, or Bangladesh.

"Asian-Pacific American," as used in this provision, means a United States citizen whose origins are in Japan, China, the Philippines, Vietnam, Korea, Samoa, Guam, the U.S. Trust Territory of the Pacific Islands, the Northern Mariana Islands, Laos, Cambodia, or Taiwan.

"Native Americans," as used in this provision, means American Indians, Eskimos, Aleutes, and native Hawaiians.

"Small business concern," as used in this provision, means a concern, including its affiliates, that is independently owned and operated, not dominant in the field of operation in which it is bidding on Government contracts, and qualified as a small business under the criteria and size standards in 13 CFR 121.

"Small disadvantaged business concern," as used in this provision means a small business concern that business concern that (1) is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged, or a publicly owned business having at least 51 percent of its stock owned by one or more socially and economically disadvantaged individuals, and (2) has its management and daily business controlled by one or more such individuals.

(c) Qualified groups. The offeror shall presume that socially and economically disadvantaged individuals include Black Americans, Hispanic Americans, Native Americans, Asian-Pacific Americans, Asian-Indian Americans and other individuals found to be qualified by the SBA under 13 CFR 124.1.

9. 52.214-02/52.215-06 TYPE OF BUSINESS ORGANIZATION (APR 1984)

The bidder/offeror or quoter, by checking the applicable box, represents that it operates as ☐ a corporation incorporated under the laws of the State of _____, ☐ an individual, ☐ a partnership, ☐ a nonprofit organization, or ☐ a joint venture.

10. 52.216-08 PARENT COMPANY AND IDENTIFYING DATA (APR 1984)

(Applicable to formal advertising.)

(a) A "parent" company, for the purpose of this provision, is one that owns or controls the activities and basic business policies of the bidder. To own the bidding company means that the parent company must own more than 50 percent of the voting rights in that company. A company may control a bidder as a parent even though not meeting the requirement for such ownership if the parent company is able to formulate, determine, or veto basic policy decisions of the offeror through the use of dominant minority voting rights, use of proxy voting, or otherwise.

(b) The bidder ☐ is, ☐ is not owned or controlled by a parent company.

(c) If the bidder checked "is" in paragraph (b) above, it shall provide the following information:

Name and Main Office Address of Parent Company
(including Zip Code)

Parent Company's Employer's
Identification Number

(d) If the bidder checked "is not" in paragraph (b) above, it shall insert its own Employer's Identification Number on the following line _____.

11. 552.215-75 DATA UNIVERSAL NUMBERING SYSTEMS (DUNS) (APR 1984)

(a) The offeror shall insert the DUNS number applicable to the offeror's address entered on the Solicitation Offer, and Awards Form.

(b) If the offeror's production point (point of final assembly) is other than the location entered on the Solicitation, Offer, and Awards Form, or if additional production points are involved, the offeror is requested to furnish the DUNS number applicable to each production point. Spaces for inserting these numbers are provided in the clause of this solicitation where offerors are to list production point addresses.

(c) If DUNS numbers have not been established for the addresses indicated in paragraphs (a) and (b) of this clause, GSA will arrange for the assignment of these numbers after award of a contract, and will notify the Contractor accordingly.

12. 552.209-71 CERTIFICATION REGARDING PREVIOUS CRIMES, DEBARMENTS, SUSPENSIONS AND DEFAULTS (APR 1984)

(a) The offeror certifies that, within 3 years prior to the date of this offer, it and/or any of its officers and principal employees

(1) Have ☐ have not ☐ been indicted, otherwise charged or convicted of:

(i) A criminal offense incident to obtaining or attempting to obtain a public (Federal, state, or municipal) or private contract or subcontract thereunder, or in the performance of such contract or subcontract

(ii) A violation of the Organized Crime Control Act of 1970;

(iii) A violation of the Federal or State Antitrust statutes arising out of the submission of bids or proposals; or

(iv) Embezzlement, theft, forgery, bribery, falsification or destruction of records, fraud, tax fraud, receiving stolen property, or equivalent crimes which are indicative of a lack of business integrity.

(2) Have ☐ have not ☐ been debarred or suspended from the award of public contracts;

(3) Have ☐ have not ☐ had a public contract terminated for default.

(b) For the purpose of this certification, a principal employee is defined as the person(s) acting in a managerial or supervisory capacity who will be responsible for administering the offeror's performance of the contract to be awarded under this solicitation (e.g., project manager, plant manager).

(c) By submitting this certification, the offeror agrees to immediately notify the Contracting Officer, in writing, of any revision to the above certification based upon changed circumstances from the submission of its offer up to contract award, or for the duration of its offer.

(d) The knowledge of the person who executes this certification is not required to exceed the "knowledge" which that person reasonably can be expected to possess.

(e) A certification that any of the items in (a) above exist will not necessarily result in the withholding of an award under this solicitation. However, the certification will be considered in connection with the determination of an offeror's responsibility. Offerors who fail to furnish the certification and provide such additional information as requested by the Contracting Officer will not be responsible.

(f) The Government may utilize the remedy delineated in the Termination-Erroneous Representations Concerning Crimes, Debarments, Suspensions, and Defaults clause at 552.209-72 in addition to other remedies available to the Government, if the offeror furnishes an erroneous certification and contract award results from this solicitation.

13. 52.203-02 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1984)

(a) The offeror certifies that—

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to (i) those prices, (ii) the intention to submit an offer, or (iii) the methods or factors used to calculate the prices offered;

(2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a formally advertised solicitation) or contract award (in the case of a negotiation solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory and the signatory—

(1) Is the person in the offeror's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraphs (a) (1) through (a) (3) above; or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a) (1) through (a) (3) above _____ [insert full name of person(s) in the offeror's organization responsible for determining the prices offered in this bid or proposal, and the title of his or her position in the offeror's organization];

(ii) As an authorized agent, does certify that the principals named in subdivision (b) (2) (i) above have not participated, and will not participate, in any action contrary to subparagraphs (a) (1) through (a) (3) above; and

(iii) As an agent, has not personally participated, and will not participate, in action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the offeror deletes or modifies subparagraph (a) (2) above, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

14. 32.203-04 - CONTINGENT FEE REPRESENTATION AND AGREEMENT (APR 1984)

(a) Representation. The offeror represents that, except for full-time bona fide employees working solely for the offeror, the offeror—

[NOTE: For interpretation of the representation, including the term "bona fide employee," see Subpart 3.4 of the Federal Acquisition Regulation.]

(1) ☐ has, ☐ has not employed or retained any person or company to solicit or obtain this contract; and
 (2) ☐ has, ☐ has not paid or agreed to pay to any person or company employed or retained to solicit or obtain this contract any commission, percentage, brokerage, or other fee contingent upon or resulting from the award of this contract.

(b) Agreement. The offeror agrees to provide information relating to the above Representation as requested by the Contracting Officer and, when subparagraph (a) (1) or (a) (2) is answered affirmatively, to promptly submit to the Contracting Officer—

(1) A completed Standard Form 119, Statement of Contingent or Other Fees, (SF 119); or
 (2) A signed statement indicating that the SF 119 was previously submitted to the same contracting office, including the date and applicable solicitation or contract number, and representing that the prior SF 119 applies to this offer or quotation.

15. 32.223-01 CLEAN AIR AND WATER CERTIFICATION (APR 1984)

(Applicable if the offer exceeds \$100,000 or the contracting officer has determined that orders under an indefinite quantity contract in any year will exceed \$100,000, or a facility to be used has been the subject of a conviction under the Clean Air Act (42 U.S.C. 1857c-8 (c) (1) or the Federal Water Pollution Control Act (33 U.S.C. 1319 (c)) and is listed by EPA, or is not otherwise exempt.)

The offeror certifies that—

(a) Any facility to be used in the performance of this proposed contract is ☐ , is not ☐ listed on the Environmental Protection Agency List of Violating Facilities;

(b) The offeror will immediately notify the Contracting Officer, before award, of the receipt of any communication from the Administrator, or a designee, of the Environmental Protection Agency, indicating that any facility that the offeror proposes to use for the performance of the contract is under consideration to be listed on the EPA List of Violating Facilities; and

(c) The offeror will include a certification substantially the same as this certification, including this paragraph (c), in every nonexempt subcontract.

16. 32.215-11 AUTHORIZED NEGOTIATORS (APR 1984)

(Applicable to negotiated acquisitions)

The offeror or quoter represents that the following persons are authorized to negotiate on its behalf with the Government in connection with this request for proposals or quotations: [list names, titles, and telephone numbers of the authorized negotiators].

I-FSS-920 (4/84)

CHANGES, MODIFICATIONS, OR DEVIATIONS: No changes, modifications, or deviations in contract requirements shall be made by the contractor without written approval by the contracting officer.

I-FSS-924 (4/84)

PARAGRAPH 13 (F SF 33, DISCOUNTS FOR PROMPT PAYMENT: (Applicable to advertised solicitations only.) Bidders are cautioned about inserting payment due, or NET, terms in Paragraph 13 of SF 33 as these terms are already established in the Payment Due Date Clause (I-FSS-916A or I-FSS-916B). Inserting a shorter time for payment due will cause the bids to be rejected as nonresponsive. EXAMPLE: If the Payment Due Date Clause provides for payment due terms of 30 days and the bidder inserts NET/20 in Paragraph 13 of SF 33, the bid will be considered non-responsive. This does not apply to discounts for prompt payment.

K-552.253-70 (4/84)

FORMS CONTAINING SOLICITATION PROVISIONS AND/OR CONTRACT CLAUSES INCORPORATED BY REFERENCE: This solicitation incorporates the following forms containing solicitation provisions and/or contract clauses by reference, with the same force and effect as if they were included in full text. Upon request, the contracting officer will make the forms available.

GSA Form 3501 - Solicitation Provisions (Advertised)

GSA Form 3507 - GSA Supply Contract Clauses

K-52.214-14 (4/84)

PLACE OF PERFORMANCE-FORMAL ADVERTISING:

(a) The bidder, in the performance of any contract resulting from this solicitation, () intends, () does not intend (check applicable box) to use one or more plants or facilities located at a different address from the address of the bidder as indicated in this bid.

(b) If the bidder checks "intends" in paragraph (a) above, it shall insert in the spaces provided below the required information:

Place of Performance (Street Address,
City, County, State,
Zip Code)

Name and Address of Owner
and Operator of the Plant or
Facility if Other than Bidder

K-52.225-8 (4/84)

BUY AMERICAN ACT-TRADE AGREEMENTS ACT-BALANCE OF PAYMENTS PROGRAM CERTIFICATE:

(a) The offeror hereby certifies that each end product, except those listed in paragraph (b) below, is a domestic end product (as defined in the clause entitled "Buy American Act-Trade Agreements Act-Balance of Payments Program") and that components of unknown origin have been considered to have been mined, produced, or manufactured outside the United States or a designated country as defined in section 25.401 of the Federal Acquisition Regulation.

(b) Excluded end products:

<u>Line Item Number</u>	<u>Country of Origin</u>
_____	_____
_____	_____
_____	_____

(List as necessary)

(c) Offers will be evaluated by giving certain preferences to domestic end products and designated country end products over other end products. In order to obtain these preferences in the evaluation of each excluded end product, offerors must identify below those excluded end products that are designated country end products. Offerors must certify by inserting the applicable line item numbers in the following:

The offeror certifies that the following supplies qualify as "designated country end products" as that term is defined in the clause entitled "Buy American Act-Trade Agreements Act-Balance of Payments Program":

(Insert line item numbers)

(d) Offers will be evaluated in accordance with Part 25 of the Federal Acquisition Regulation.

L-552.225-73 (4/84)

ELIGIBLE PRODUCTS FROM NON-DESIGNATED COUNTRIES - WAIVER: In accordance with the Trade Agreements Act of 1979 and FAR 25.402(b), no eligible product which originates in non-designated foreign country may be purchased by a Federal agency, unless there is a waiver under the provisions of section 302(g)(2) of the Trade Agreements Act of 1979. This solicitation includes eligible products and restricts the purchase of such eligible products to those originating in the United States or in a designated country; however, this restriction may be waived when determined to be in the national interest. It is expected that a waiver would likely be granted if responsive bids or offers are not received to furnish eligible products of the United States or designated countries in sufficient quantities, and of such quality, to meet the Government's needs. A waiver may also be granted for any other reason when in the national interest. Accordingly, bids or offers to furnish eligible products from non-designated countries may be submitted in response to this solicitation; if a waiver is sought and granted prior to award, such bids or offers will be given consideration, subject to the provisions of the Buy-American Act and the Balance of Payments Program.

L-FSS-490 (4/84)

UNSOLICITED SAMPLES, DESCRIPTIVE LITERATURE, OR BRAND NAME REFERENCES: When procurement is effected under specifications or purchase descriptions (other than "brand name or equal") and the Government does not specifically request bid samples, descriptive literature, or references to brand names, models, or part numbers, as an integral part of the bid, and the bid is accompanied by any of those materials, the materials will be disregarded, unless it is clear from the bid or accompanying papers that it was the bidders' intention to qualify the bid.

M-FSS-FN-235 (4/84)

PORTS OF EXPORTATION: For the purpose of evaluating offers and for no other purpose, the ports of exportation listed below shall apply to this procurement. The combined ocean transportation and bunker fuel allowance to be applied in evaluating offers are shown for each port.

<u>Port of Exportation</u>	<u>Combined Ocean Handling Charges & Bunker Fuel Allowance per Measurement Ton of 40 Cubic Feet to Germany</u>
New York, NY	\$27.55
Baltimore, MD	27.55
Norfolk, VA	27.55
New Orleans, LA	50.79
San Francisco, CA	51.86
Los Angeles, CA	51.86

The contractor will be notified prior to the anticipated shipping date of the point of exportation to which the material is to be delivered (see clause entitled "Export Traffic Release"). If award under this solicitation is based on other than f.o.b. origin prices, and if the actual port of exportation selected by the Government is not the same as that on which the award was based, shipment will be diverted in accordance with Article 46 of the GSA Supply Contract Clauses (GSA Form 3507).

NOTE: Stuffing is to be performed at contractor's plant. Placement of containers at the plant will be at the contractor's expense. Shipments over 800 cubic feet and/or 10,000 lbs. will be shipped through a port specified by MTMC/GSA. Shipments under 800 cubic feet and/or 10,000 lbs. will be shipped through the Army Consolidation and Containerization point, New Cumberland, Pennsylvania.

M-FSS-302F (4/84)

METHOD OF AWARD: Award will be made in the aggregate by group on the basis of the lowest delivered cost to the Government evaluated to an overseas port of discharge for the ultimate destination shown for the items in the item listing. Offers will be evaluated by multiplying the unit price submitted on each item by the quantity specified and adding to the total of the resultant extensions the combined ocean transportation and bunker fuel allowance charges applicable to whichever of the ports of exportation listed herein is specified by the offeror. In order to qualify for an award on a group, prices must be submitted on each item within the group.

APPENDIX H

METRIC CONVERSIONS

APPENDIX H

METRIC CONVERSIONS

Where the metric equivalent is not given in the text of this report, the following metric conversion factors may be used.

<u>From</u>	<u>To</u>	<u>Multiply By</u>
feet (ft)	meters (m)	0.305
gallons (gal)	liters (l)	3.785
pound (lb)	kilogram (kg)	0.454
pounds square inch (psi)	kilopascal (kPa)	6.894
square feet (ft ²)	square meter (m ²)	0.093

<u>To convert</u>	<u>To</u>	
degree Fahrenheit (°F)	degree Celsius (°C)	$t_c^{\circ} = (t_f^{\circ} - 32) / 1.8$